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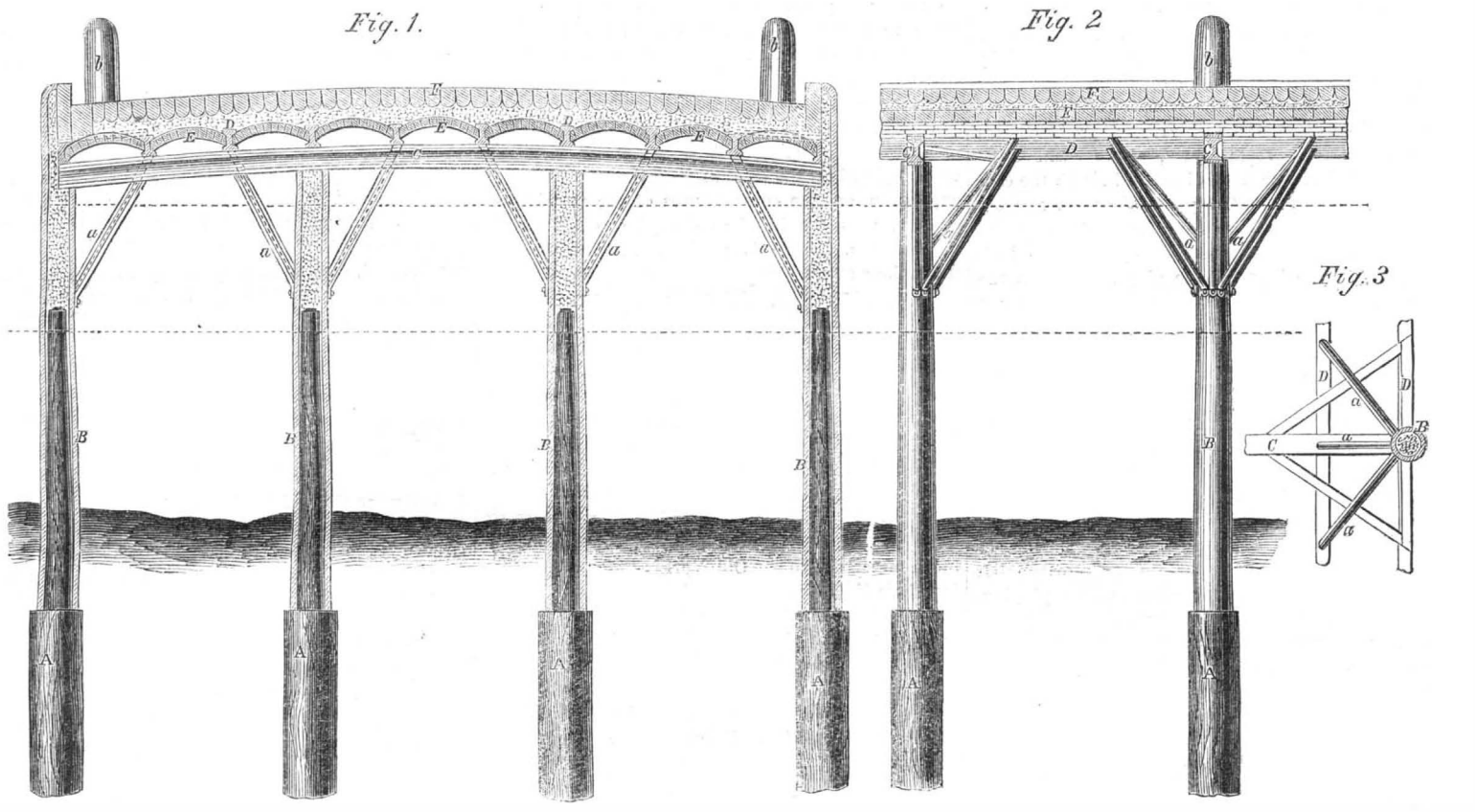
Improved Patent Bridge.

The construction of durable piers and bridges is a matter of great importance, and involves much study on the part of engineers, in order that the best results may be arrived at. Iron bridges have been erected over various rivers and streams in the country, but the footways are generally laid with planks or joists, so that an incendiary or other malicious person finds it an easy matter to destroy them. The annexed engraving is a representation of a road-way which can be erected over streams or other



WOOD'S PATENT BRIDGE.

places where it is required, without necessarily employing any wood or combustible substance in its construction where it can be destroyed. The wooden piles, A, are driven down into the bed of the stream and have shoulders on which the cast-iron columns, B, rest; these columns when placed in position, are filled with concrete cement, which soon sets and becomes as durable as stone. The girders, C, are slightly arched and rest upon the columns at either end and in the center; they are crossed at right angles by another series of girders laid over them. The masonry, E, is built in between the upper girders and is also arched to resist pressure; upon the top of the masonry a filling of gravel or sand, D, is thrown, and the stone pavement, F, is then laid in the usual manner. The longitudinal girders are stayed to the upright columns by the braces, *a*, and the transverse-girders are also provided with similar appendages, shown in Fig. 3.

ig. 2, represents an end view of this invention, in which the arrangement of the several parts is clearly shown. The dotted lines across the face of the engraving indicate the high and low water-marks, and the dark horizontal lines below show a profile of the river bed. The cast-iron posts, *b*, are anchored in the bridge for the convenience of mooring vessels. This bridge if properly constructed, would seem to be a very good one; when protected from extremes of temperature, it affords a good and permanent roadway which cannot be torn up without a great deal of trouble; and cannot be burnt down at all, as there are no timbers, except the submerged piles, used in the structure. For spanning streams on lines of railway, bridges made on this plan are highly desirable; and the principle involved in their construction can be readily applied to piers and wharves. This method of making bridges is the invention of Mr. W. H. Wood, of Hudson City, N. J., and was patented on Oct. 22, 1862; further information can be had by addressing him as above.

Window Glass.

American window glass is now very generally used in place of German and other imported glass, and owing to the present high rate of exchange, as well as the increased duty upon foreign glass, our domestic brands are sure to be in still greater request. We are not sorry to note this tendency, and congratulate our manufacturers (whose business has been of late years far from profitable) upon their brightening prospects. Between the best makes of American glass and the imported article there is really but little choice. The former, indeed, although not deficient in strength, is perhaps scarcely equal in this regard to foreign, but it is certainly not inferior in crystalline clearness and brilliancy of surface, and this is a merit which cannot be too highly estimated.

In many quarters, and especially in New England, there has existed an inveterate prejudice in favor of imported window glass. This prejudice had its origin, we presume, in the circumstance that our markets have always been well stocked with inferior glass from third-rate home factories. It is owing to this fact, undoubtedly, that all domestic glass has fallen, more or less, into disrepute. A party, for instance, actuated perhaps by a patriotic desire to encourage home industry, and finding, it may be that he can also save money by yielding to the patriotic impulse, buys a lot of American glass. Under the impression that all American glass is equally good, he is quite likely to get, unawares, these "wild-cat" makes. He is disappointed, of course, and still believing his lot to be a fair sample of all American glass, he will scarcely venture a second trial, unless swayed by thrift rather than by patriotism.—*Exchange.*

NEW MATERIAL FOR PAPER.—Mr. James R. McElfatrick, of Fort Wayne, Ind., has forwarded to us some of the fibrous material obtained from the bolls of the sycamore tree, which he thinks will answer well for making paper. It is a short staple of cotton of a buff color, and undoubtedly paper can be made from it as well as from any other vegetable fiber. He states that unlimited quantities of it can be obtained in the Western States. Some of the Western paper-makers should make experiments with it.

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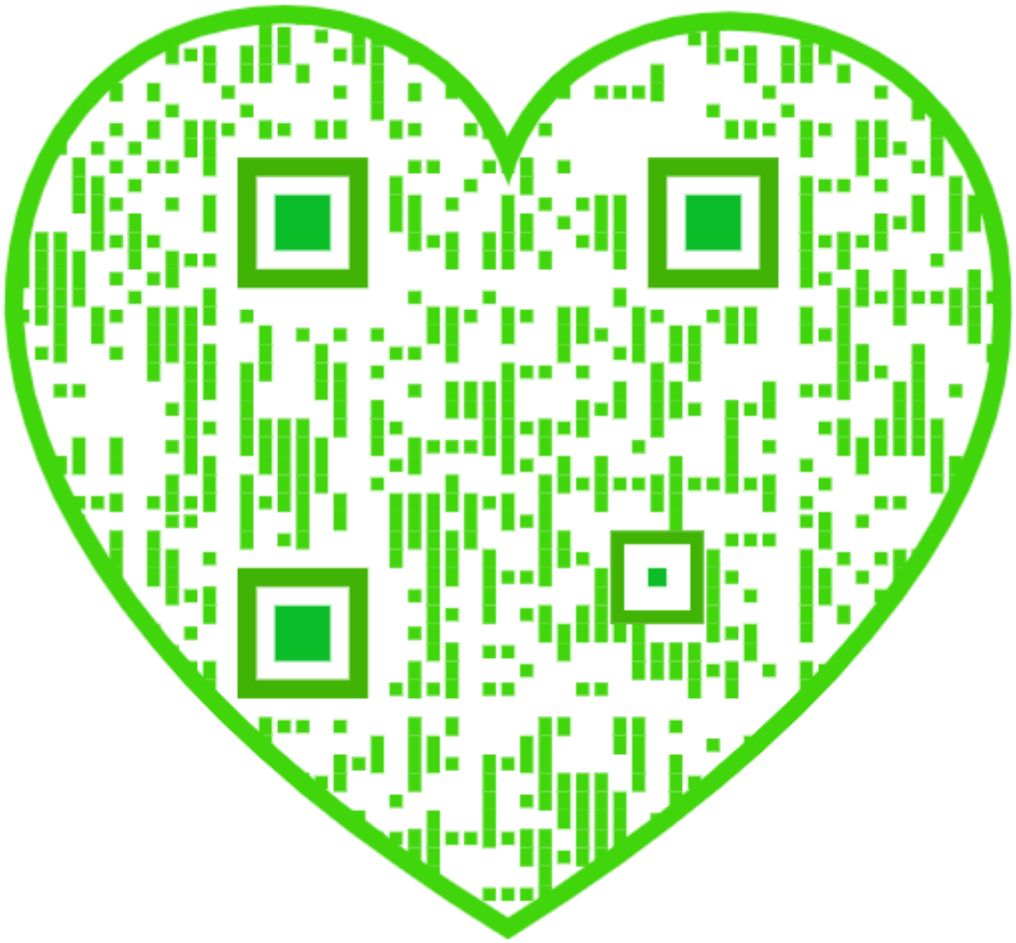

SWINDLING BY MACHINERY.

We do not know who is the inventor of the system of machinery described below, but he or they managed to obtain possession of large sums of money by the operation of it, which, fortunately for the Government, was nearly all recovered. We once read an account of a machine, used in a Paris gambling-house, which operated by smothering the "unfortunate-fortunate" winner after he had retired for the night; the top of the bed, wherein he was reposing, descended by a screw working through the ceiling above, and thus extinguished him. The apparatus was detected by one person who refused to be "put out," and he escaped by the window and brought the detectives to the house immediately. Modern gamblers are more polite; they are averse to the shedding of blood, and therefore confine their irrepressible genius to simply robbing without the possibility of failure. Annexed is a description of the apparatus used in Cleveland, Ohio, to rob Paymaster Cook, whose case was recently noticed so generally by the press. Conlisk, one of the men concerned in "fleecing" the paymaster Cook, was a frequent visitor to Cleveland, and occupied rooms in the third story of the Parsons Block on Superior street. The rooms occupied by Conlisk consist of a sitting-room, where the gambling was done, and a bed-room. The sitting-room was furnished in the usual manner, and had a faro table near the windows, and a draw-poker table in the center of the room, with chairs placed to each. The walls and ceiling of the room are papered with paper of a star pattern. Directly over the rooms are two other rooms, also occupied by Conlisk, but not furnished. A portion of the flooring has been removed in the room immediately over the gambling-room, and a small hole bored through the ceiling of the room below, above each of the tables. As the holes come directly through the center of a star pattern in the paper, they are scarcely distinguishable from below. Each hole is so placed as to enable a person applying his eye to it, to look directly into the hand of the player seated in the chair. An ingenious telegraphic signal machine was discovered communicating between those holes in the room above and the chair of the gambler in the room below. A wire, having a handle near the hole, passed along between the flooring of the room above and the ceiling of the room below to the corner of the gambing-room and bed-room. It enters the bed-room and passes down in the corner, being concealed by a strip of board nailed up and papered over. It then passes under the floor of the gambling-room to the table, where a small piece of the flooring has been cut away close by the table leg, where the left foot of the gambler would be placed whilst playing. There it terminates in a spring and hammer, concealed by the carpet. The method of working this invention for robbing by machinery seems to have been as follows: The victim to be operated upon finds two chairs drawn up to the table. In one of these the gambling thief seats himself, at once placing his foot over the telegraph hammer. The victim is obliged to take the other, which is placed in the proper position for playing. The gambler's accomplice in the room above stretches himself on a mattress, with his eye at the peep-hole—and one hand grasping the telegraph handle. The hole is so placed that he can look directly down into the hand of his victim. As soon as he sees the cards he telegraphs their description according to an arranged code of signals by pulling the handle, when the hammer strikes the desired number of raps on the sole of the gambler's boot or slipper, the sound being muffled by the carpet. Of course, it is easy to see that the man who sits down to play with such a gambler is robbed as surely, completely and systematically, as if he had been bound hand and foot, and delivered over to a highwayman; and of the two robbers, the highwayman would be the more decent man.

It will thus be seen that the gambling mind is equal to all emergencies. There are gamblers in this city, and it behooves those persons who are fond of throwing away their money, to consider the above paragraph well, for if they be not robbed through the agency of the method described, they may be assured that some other plan equally forcible, will be put in practice, whereby they are surely, but not slowly, deprived of their money. We read in the "Vicar of Wakefield" that poor Moses (son of the vicar) was badly taken in by a sharper who represented himself as of the reverend "persuasion," and did the inexperienced youth out of a promising colt which the worthy vicar hoped would bring him a large sum of money. The "spectacles in shagreen cases," the only equivalent received for the beast, operated quite as well as the best machinery for the purpose; even they, however, did not prevent the same swindler from enveloping Moses in his toils a second time, if our memory serves us.

The systematic pursuit of gaming as a passion, and not as a profession, in England and France, during the last fifty years, led several men of more than ordinary mathematical abilities to make accurate calculations of the real chances of various games. In doing this it was discovered that, in all cases, the "banks" so arranged their games that there could be no positive fair play. In *rouge et noir*, which was once a very fashionable game in the gambling hells of this country, the certain and inalienable advantage of the banks against the players, made by a peculiar rule of the game, amounts to about 1½ per cent. on all the moneys staked on one event—or to about 100 per cent. per hour against each steady player! And this deadly odds neither skill nor calculation on his part can in the slighest degree divert. The vice of gambling assumes as many different aspects, as a chameleon does colors. There are individuals in this city who live by commending various unseaworthy watches to public favor, and who make an immense profit by swindling countrymen who come to this city. There is such an establishment near the Museum, but the cries of the auctioneer are likely to be hushed for a time, as we saw, the other day, a stalwart policeman pacing up and down in front, for the purpose of warning off all persons in danger of being "fleeced." Wrath and futile anger were depicted on the faces of the sharpers, while the expression on the countenances of the pseudo-purchasers, who are hired as decoys, was ludicrous in the extreme. There is no law, it seems, that will reach their cases.

PITTSBURGH PETROLEUM TRADE.

The most complete account of the American oil regions and history of the petroleum trade, heretofore published, appeared in the Scientific American in an article on page 122, Vol. VI (new series), and in a series of articles commencing on page 20, Vol. VII. This rock-oil business is one of the great wonders of the age. As a branch of trade it is continually growing in importance. For many years we have been sending the "staff of life," in the form of bread materials, to the Old World; we are now sending them light, in the form of oil obtained from the rocky cells of our Western valleys. The rapid rise and great extent of the petroleum trade in Pittsburgh has been set forth in a very interesting manner in a late report by Mr. Thurston, published in the Pittsburgh *Evening Chronicle*, as presented to the "Oil Exchange" in that city. From this we condense the following particulars:—

Not a barrel of petroleum had been landed at Pittsburgh three years ago. Within that space of time two millions of barrels have been delivered on the wharves of that city. The value of this quantity, unrefined, amounted to $8,000,000; when refined, $17,000,000; two-thirds of the quantity were refined, in Pittsburgh and its vicinity. There are 60 oil refineries in that city, in which 600 persons are employed, and which, in buildings and apparatus, represent a capital of $1,000,000. In these refineries 1,200,000 bushels of coal are consumed annually. From nothing this petroleum business has arisen in three years to be second only in importance to the iron trade of Pittsburgh, simply because it is the center of the oil-producing region of the United States, and possesses superior facilities for importation, exportation and refining.

PHILADELPHIA.

From the recent message of Mayor Henry, we obtain some interesting facts relating to Philadelphia. The receipts into the City Treasury in 1862, amounted to $4,003,472, from usual revenue, and from credits and other sources, the total was $7,336,376; the payments were $6,302,672. The entire funded debt of Philadelphia is $24,354,341. Registered taxes for 1862 amounted to $3,097,863, of which nearly four hundred thousand dollars have not been collected. Building has been prosperous, as 2,154 new dwelling-houses, 80 stores, 58 factories, and 115 other structures were erected in 1862, being an increase of 619 over the previous year. At the present time Philadelphia contains 94,000 dwelling-houses. It seems that the city is but imperfectly supplied with water, although vast sums have been expended upon water wheels and steam engines for pumping it from the two rivers, the Schuylkill and Delaware. The water of the latter has been found rather impure for domestic use, and the Schuylkill cannot be relied upon for a full supply. Wherever plenty of good water can be obtained by gravitation, although it may have to be carried a long distance and the original cost is great, still it is the best way to furnish water for a large community. The city of Glasgow in Scotland, used to be supplied with water pumped by Cornish engines from a river and forced a distance of two miles. Within four years, a copious supply of better water has has been carried by gravitation (as in New York), a distance of forty miles, and the old system has been abandoned with the most favorable results. There have been fewer deaths in Philadelphia than in the previous year, and crime has decreased. The quantity of gas made was 656,987,000 cubic feet; there are 427 miles of street main gas-pipes and 101 miles of service pipe in use. On the whole Philadelphia is a great city and is in a prosperous condition.

Manufacturing Items.

At the Builder's Iron Foundry, Providence, R. I., four tuns of shells are cast each day, and cannon as fast as they can be finished. Fifteen eleven-inch guns have already been cast, six of which are nearly finished. The specific gravity and tenacity of each gun are ascertained by the department at Washington, from samples of the material taken from each casting. A new air furnace of a capacity of twenty-five tuns, similar to the one now in use, has been constructed, also a pit, preparatory to casting thirteen-inch cannon, which will be commenced soon.

Preparations are being made at the Fort Pitt Works, Pittsburgh, for the construction of a twenty-inch gun. This gigantic piece of ordnance will require for the rough casting between 75 and 100 tuns of metal. The solid shot for it will weigh 1,000 pounds.

In Lowell the cotton mills are mostly stopped. Out of more than 12,000 looms there are little more than 1,000 running. At the Lowell machine-shop (Andrew Moody, Superintendent) some 750 hands are now employed, turning out a vast amount of work. This is the most extensive establishment in New England for building cotton machinery, turbine wheels, mill gearing, machinist's tools, locomotives, paper machinery, castings, &c., and this business never was in a more flourishing condition.

Rice's new wire mill at Holyoke, Mass., is just about commencing operations, and will employ 100 hands. The old wire mill has been sold to the Hampden cotton mills, and is to be immediately filled with cotton machinery.

L. L. Brown & Co., of South Adams, Mass., have machinery nearly completed for making paper from wood.

The Adams (Mass.) *News* says that a careful review of the statistics concerning the manufacture of writing paper in Berkshire county, shows that there is invested within that county, in mills and machinery, $923,000, employing 1,180 persons, and producing an annual value of $2,000,000.

Launches.—On the 17th ult., the new steamboat *City of New London*, was launched from the shipyard of John Englis & Son, Greenpoint, L. I. Her length is 225 feet, breadth 36 feet, depth 12 feet. She belongs to the Norwich and New York Transportation Company. Messrs. Englis & Son also launched on the 21st, from their yard foot of Tenth street, East river, this city, a steamer for James T. Sanford, Esq., to ply between Boston, Mass., and Bangor, Maine. Her length on deck is 245 feet, breadth of beam 34 feet, depth 12 feet 3 inches. The ship-building business in New York was never more prosperous than it is at the present moment

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MISCELLANEOUS SUMMARY.

SHIPPING OF NEW YORK.—From the records of the Custom House it is ascertained that 5,406 vessels arrived at New York from foreign ports in 1862, the total tunnage of which was 2,552,481 tuns. Of this number 2,692 were American vessels, representing a tunnage of 1,472,989 tuns. This is a total increase of 429 vessels and 68,797 tuns over 1861. The total number that cleared last year was 5,016, the tunnage of which was 2,487,852 tuns.

THE LONDON UNDERGROUND RAILWAY.—This railway, which has been already described in our columns, was opened to the public on the 13th of January. The trains run every ten minutes. On the first day 38,000 passengers were carried on it, and the average every day since has been 26,500.

AMERICAN SILVER IN CANADA.—The Toronto *Globe* gives the following explanation of the cause of so much American silver being in Canada :—"In Canada we had been accustomed to take United States silver at par. Availing themselves of this condition of things, brokers from the other side, having first bought up all the silver they could lay their hands on, brought it over here, exchanged it for gold, which they took back home with them and re-exchanged for silver at a relative discount, repeating the process again and again with very large profits. The result was inevitable. Silver took the place of notes in the hands of the public, thereby decreasing the circulation of the banks, which refused to receive it on deposit. For a time, in fact, our merchants and traders had to be their own bankers. This state of things, of course, could not last; there was more silver in the banks than was needed, and like everything else whereof the supply exceeds the demand, it went down in price. The discount now generally charged upon it is four per cent. American silver, in consequence of a greater relative amount of alloy, could not, like gold, be exported to foreign countries, where it would be rated at its intrinsic worth, and consequently it did not rise to so high a premium."

AMERICAN PETROLEUM AS FUEL IN PARIS.—A French paper says :—"An American gentleman (Mr. J. L. Linton) has lately visited Paris for the purpose of submitting to the French Government his new method of generating steam. Instead of the ordinary fuel, he uses petroleum oil. The points which his patent particularly dwells on are these :—From water of equal temperature the time required for generating steam to 20 lbs. pressure above the atmosphere was found by actual experiments to be in favor of the oil—17 minutes to 31 minutes. The cost of coal oil, extracted from one tun of cannel coal, delivered in any port in France, would be less than the coal, in consequence of the cost of carriage for the latter; and the use of oil thus extracted would generate infinitely more steam than the coal itself. The saving in bulk over coal is 250 per cent., and in weight 500 lbs. of oil are equivalent to 2,000 lbs. of coal. Ten men, with the use of oil, in the fire-room department of a ship, are equal to fifty with coal. The largest steamers now running between New York and Liverpool require 1,200 tuns space for coal, whereas, with the use of oil as fuel, 450 tuns would be sufficient. It can be applied with great advantages for locomotives on railways, and stationary engines, as well as for ordinary heating purposes. The plan has been examined by a Government committee in Paris."

HOW COAL WAS SENT TO THE "QUEEN OF THE WEST."—The running of the Vicksburgh blockade by a coal barge has already been noticed by telegraph. The manner in which the feat was accomplished was as follows :—

It was at first suggested to send a barge-load of coal to her in tow of an iron-clad; but then the iron-clad would have had to run the blockade twice. Finally, Admiral Porter determined to trust the barge to the mercy of the current at midnight of the 17th, and his plan was successful. "Broad Horn" drifted past the batteries, and was met at a safe point by three men from the ram, in a small boat, who steered her safely to her destination. The rebels may have seen her lazily making her way south, but concluded she was not worth the trouble of picking up, and let her go by unmolested. By this manœuvre the ram was saved the risk of having to run the blockade twice, and perhaps from being destroyed.

It is reported that this gallant ram has been since captured by the enemy, through the treachery of the pilot.

GOVERNMENT CONTRACTS.—The contract just awarded here, includes 535,000 pounds India rice at 8c. per pound; 1,500 barrels New Orleans sugar at 13c. per pound; 2,000 barrels ditto at $12 95 per 100 pounds; 416,000 pounds very choice Rio coffee, roasted and ground, at $42 88 per 100 pounds; 31,407 pounds ditto green, at 35c. per pound; 1,462 barrels extra mess beef at $14 25 a $14 95 per barrel; 22,500 pounds smoked sugar cured hams at $9 74 per 100 pounds; 50 barrels beef tongues at $16 50; 2,000 bushels choice white beans at $3 12 per bushel; 3,000 bushels ditto at $2 92; 9,000 gallons superior Bourbon whisky at $2 per gallon, and 170,000 gallons good common ditto at 90c.

The Gunboats "Ossippee" and "Juniata."

The Secretary of the Navy officially declares to the Senate that the disabling of the *Ossippee* resulted from the cutting of the cylinder slide valves, caused by the softness of the iron.

Four hulls of vessels have been fitted with engines built on this plan. Ten have similar machinery, of which eight have been tried, two only giving way. The trouble with the *Ossippee* and *Juniata* arose from the fact that their builders were inexperienced, and had neither proper shops, tools, mechanics nor engineers.

With regard to the failure of the *Pensacola*, Chief Engineer Isherwood reports that she was built at Pensacola, and the machinery at Washington, from designs by E. N. Dickerson and Fred. E. Sickles, under a contract with Secretary Toucey, in 1858. One of these persons was the patentee of an alleged improvement in engines; and the other a lawyer, with intimate relations with Messrs. Mallory and Yulee, of the Senate Naval Committee, and the plan was tried, in opposition to the opinions of the Engineers of the Navy. Owing to numerous blunders, the machinery was two years and nine months in preparation. Its cost was $328,460. She was with difficulty got to New Orleans, and was there reported to be useless until her machinery was replaced.

We understand, also, that the committee appointed to examine Mr. Isherwood's plans for steam naval machinery have reported against them. What is the matter with the engineering talent in the United States? Have we no engineers who understand their business well enough to design steam-machinery that will be serviceable? We imagine the trouble lies in the fact that simplicity of arrangement is not sought for—through the conceit of those who prefer to conjure up new notions out of their own stupid noddles—rather than rely upon the well-settled principles that rule in our best engineering establishments.

The Accident to the "Great Eastern."

The directors of the *Great Eastern*, on the return of that vessel from New York, deemed it their duty to hold an investigation into the circumstances under which she met the accident off Montauk, in the latter part of August last. The result has been the entire acquittal of Captain Paton from all blame; we append a copy of the letter addressed to him by the company, and we echo the wish that he may have a long and prosperous career in the command of the noble ship:—

GREAT SHIP COMPANY, Liverpool, Jan. 26, 1863.

DEAR SIR:—The directors, as you are aware, having considered it their duty to investigate the circumstances attending the accident to the *Great Eastern* off Montauk Point, on the morning of the 27th of August last, met on board the ship on the 23dinst., for the purpose of holding the inquiry, and in which they were kindly assisted by Mr. H. C. Chapman, Lloyd's agent at this port. Having fully investigated all the circumstances attending this untoward event, the directors have arrived at the conclusion that no blame whatever attaches either to you or to any of your officers; but that the accident is solely attributable to the ship striking on a sunken rock (in the fairway channel), which is not laid down in the charts. The directors have great pleasure in instructing me to communicate to you this decision; and trusting you will have a long and prosperous career in the command of the *Great Eastern*, I am, dear sir, yours very truly,

J. N. YATES, Secretary.

The manner in which the damage to the *Great Eastern* was repaired, and the fact that the inner skin of the vessel was not in the least injured, have contributed greatly to restore the original confidence in, and high estimation of, the vessel.—*Mitchell's Steam Shipping Journal.*

APPLICATIONS FOR THE EXTENSION OF PATENTS.

The following persons have applied to the Commissoner of Patents for the extension of their patents for a term of seven years :—

Packing for Rotary Pumps.—Caroline Cary, administratrix of Albigence W. Cary, deceased, of Brockport, N. Y., has applied for the extension of a patent granted to said A. W. Cary, for an improvement in packing for rotary pumps, on May 15, 1849. The testimony will close on April 13th, and the petition will be heard at the Patent Office on the 27th of that month.

Bending Wood.—Thomas Blanchard, of Boston, Mass., has applied for the extension of a patent granted to him, for an improvement in bending wood, on Dec. 18, 1849, subsequently surrendered, and re-issued on Nov. 15, 1859. The testimony will close on May 11th, and the petition will be heard on the Patent Office on the 25th of that month.

Persons who wish to oppose the extension of these patents should do so without delay. Copies of the claims in each case will be promptly forwarded from the Scientific American Patent Agency upon the receipt of $1.

A New Plan for Carrying Petroleum to Market.

A correspondent having seen an article in a recent number of the SCIENTIFIC AMERICAN entitled "A Pond Freshet," suggests, in view of the disasters arising from that method of getting the oil to market, that a train of pipe be laid along the river or in any other direct line most desirable, into the upper end of which the oil men could pour their oil, taking a receipt for the number of gallons and withdrawing the same quantity from the common reservoir into which all the oil found its way at the terminus of the conduit. This seems to be a sensible suggestion; there may be some local objections to it, but none occur to us, and it appears quite feasible. A company could be formed for the purpose of carrying the oil in this way, and it would doubtless be a source of profit to all concerned.

LOOKING OUT FOR SLIGHTS.—There are some people always looking out for slights. They cannot pay a visit, they cannot receive a friend, they cannot carry on the daily intercourse of the family, without suspecting some offense is designed. They are as touchy as hair-triggers. If they meet an acquaintance in the street who happens to be pre-occupied with business, they attribute his abstraction to some motive personal to themselves, and take umbrage accordingly. They lay on others the fault of their own irritability. A fit of indigestion makes them see impertinence in everybody they come into contact with. Innocent persons, who never dreamed of giving offense, are astonished to find some unfortunate word or some momentary taciturnity mistaken for an insult.

CRIPPLES ON GARRISON DUTY.—Twenty-four soldiers, crippled in the defense of their country, offer (through the columns of the Washington *Star*) to garrison forts, so that men more fitted for active service may be enabled to leave for the field. This offer has been made with the belief that there are many soldiers throughout the country in similar disabled condition who will gladly volunteer for this purpose. This is a spirit worthy of the days of the Revolution. Had this same spirit animated the hearts and purposes of the entire North, the Government would not, as now, be leaning upon a slender thread.

"AS CLEAR AS MUD."—The attorney of the Internal Revenue Bureau receives many curious letters, and is asked all sorts of queer questions concerning the national stamp license-tax. One of them runs thus :—"My two boys sell essences; are they drugs? And if so must I put stamps on them?" Another letter inquires : "Are newsboys who sell papers peddlers? Must we get a license before we can sell them?" Another wants to know : "If my wife hires a doctor who hasn't any license, have I got to pay him for it?"

AN English paper recently stated that Great Britain shipped about 13,000,000 pounds (65-pound bundles) of gunpowder, directly or indirectly, to the South in the first three months of 1863.

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THE WONDERS OF THE ANIMAL KINGDOM.

Perhaps in all the wide range of natural subjects there are none more interesting than those which relate to the wonders of the animal kingdom. Man is provided with brains, howbeit he may not always use them, and has organs of speech by which he can make known his wants. Animals also have brains, but with them instinct takes the place of reason, and the satisfaction of their wants depends almost wholly upon their powers of offense and defense and the strength and development of their animal cunning.

In the animal kingdom we are often surprised and astonished by the exhibition of traits which are almost human in their attributes. The mute affection of the dog, the fidelity of the horse and the attachment of some of the amphibia to their masters, are examples in point; and, indeed, nearly every animal, no matter how wild and ferocious they may be in a state of nature, when subjugated by man, looks to him for the supply of food which maintains life. We may seriously question whether dogs, particularly, do not, in many cases, exercise their reflective functions; certainly they exhibit, in no small degree, powers of intelligence which are wonderful. To this assertion we may attach the doubt that intelligence has anything to do with the tricks and performances which dogs acquire by tuition. May we not inquire how far fear and starvation affect these particular members of the animal kingdom in the pursuit of knowledge under difficulties? If we admit that the lash and hunger do perform no unimportant part in their education, we may relinquish the supposition of the existence of reason. For our own experience in the matter, we take pleasure in saying that we are familiar with dogs, aye, even puppies, and have never found the quadruped as rude and churlish as the biped of his species; we have not found the lash necessary—either with canines and their kind, or with other domestic brutes. This humanitarian principle is now very generally recognized, we believe, by all trainers, except only in the case of those beasts who cannot be conquered save by main force, and whom it is dangerous to approach until they have been cowed by fear. We have all heard of the story of Androcles and the lion—how the royal beast having run a thorn in his foot, suffered from it to such an extent that he was unable to bear the pain—how he made his way to the cave where Androcles was hiding, and by exhibiting the wounded paw made known his distress, which Androcles at once alleviated. In return for this office, the lion hunted for his benefactor and kept him supplied with food. The story is valuable allegorically, and we quote it as affording some ground for our statement, that kindness, like virtue, is its own reward.

The ancients were very fond of attributing semi-human qualities to animals, but the fables related of the latter are so often tinged with the fabulous that they fail to convey any good effect. If a modern lion, for instance, had run a thorn in his foot and some Androcles should extract it for him, the animal would doubtless exhibit the depth of his gratitude by swallowing the unlucky surgeon instantly. Just as the Spartans showed the folly of drunkenness to their sons by exposing their helots in that condition, so the Romans took advantage of their knowledge of natural history and the peculiar traits of beasts to satirize mankind as well as to point a moral. Æsop in particular leveled the shafts of sarcasm at the human family in his little tales with great effect. We need not, however, go back so far in the history of the world in order to arrive at the estimation in which mankind hold the animal kingdom, and the relations borne mutually. Save in the case of the monkey, who is regarded as a standing libel upon the animal—man, we think honorable consideration must be awarded to all the different tribes, races and families of animated nature on the globe; for each and all of them perform their several functions as nature intended they should. And though it may be deeply hidden why musquitoes are suffered to exist, yet we must accept their existence as being in some way conducive to our well-being morally and physically. Not through their existence alone are the beasts of the earth useful to its inhabitants. Man takes advantage of their wonderful instinct in many ways. Only recently we read a paragraph in a paper which said that, as the muskrats had dug their burrows in the river banks much lower than usual this year, there would, in all probability, be a very mild season. Thus far the prediction has been verified, and the muskrats seem likely to remain undisturbed in their seclusion.

In forethought, too, some beasts and insects teach lessons which man would do well to emulate. The ant lays up a store of food against winter; the rodents, squirrels, rabbits, &c., secrete in the recesses of old trees roots, bark, twigs and such choice edibles as will make the dreary darkness of the snow-clad forest pass cheerfully away. The bear roams the wilderness in autumn and gathers a thick coat of succulent fat from the acorn and frost-bitten buds that he may chance to fall upon. He retires to some upturned tree or rocky cave and there upon a red and purple couch of autumn leaves hibernates through the cold and gloom which is common to the season; subsisting meanwhile upon that burden of fat which he had previously accumulated upon his ribs. Man might profitably imitate even the bear; how much happier and better the world at large would be, if all human bears, who growl and snap their teeth in society, would bury themselves beyond the light of day until their ferocity had abated! The following instance of cunning on the part of "Bruin" is vouched for, as true, by the St. Paul *Union*. It is the narrative of some individual to us unknown :—

Early last spring, while passing along the bank of Crow River, my attention was attracted to a huge black bear quietly seated in the river in the midst of a roaring eddy. Taking a stand behind a tree, I watched the course of events. There sat old Bruin flat on his rump, head erect, fore paws extended, looking for all the world like an antiquated specimen of an original African. Soon his eyes twinkled and his paws twitched nervously, then a quick grasp, and lo! up came a large sturgeon firmly clutched. Old Bruin reared himself aloft, and waddled off to shore, no doubt highly gratified with the result. Now the philosophy of the thing is this: Sturgeons, in common with other kinds of fish, ascend the different streams during the spring months, seeking suitable places to deposit their spawn. While navigating the strong ripples that impede their ascent, they often grow so tired as to seek any convenient eddy to rest. Bears seem to understand this, and accordingly take a seat amid the rapidly-whirling waters, thus forming a temporary eddy. The tired-out fish unsuspectingly shoots into the treacherous snare and is remorselessly gobbled up by Bruin.

The habits of beavers, otters and other amphibia are an extremely interesting study, and we append some account of those of the former animal :—

The law of industry among working beavers is well attested to by hunters. Their dams or houses are built anew or remodeled every fall, and in a way to suit the hight of the water during the succeeding winter or spring. The object of the dam seems to regulate the hight of the water at their houses, where they have two or three berths at different hights, where they sleep dry, but with their tails in the water, thus being warned of any change in the rise or fall of the water. Some houses stand six feet at least above the surface of the meadow covered with mud, and in the form of a round coal pit, but so intersected with sticks of wood as to be strong and the weight of three or four men makes no impression upon it.

A "full family," as hunters call them, consists of the parental pair and the males of the next generation with their mates. When the tribe get large they colonize. Some time in the fall the single ones of both sexes congregate from considerable distances at the deepest lake in the vicinity where they choose their mates; how ceremonious the nuptials are we cannot say; then they all go home, the female following her mate, and all go to work, first putting the house and dam in order for winter, then laying in their stock of wood, the bark of which is their winter food. They go up the stream some three miles for their wood and float it down to their houses, and then in some mysterious way make it lie in a pile at the bottom of the pond, outside of the house, where they may take it at any time in the winter for use. It is said that no human hands can disturb it without its rising and remaining afloat till the beavers have the handling of it.

But we do not feel quite sure what is fact and what is conjecture respecting the beaver, whose works are so much in the night and deep under water. The fall of the year is a busy time with them, and it is interesting to see their new dams in process of building, as we sometimes find them across large boating streams, and not unfrequently boatmen and river divers tear away their dams and get a good head of water for their use. They usually build at the outlet of natural ponds, and sometimes they flow large lakes and long pieces of dead water, but are always moving and reconstructing. How they keep their teeth in order for so much eating, when the best steel would wear out, is a mystery. [It is no mystery at all. The teeth of the beaver, as of all rodents, are, by a beautiful provision of nature, kept as sharp as the keenest chisel in the carpenter's tool chest. The outer enamel of the tooth is very hard and the inner or bony part of it is comparatively soft; this wears away and leaves the front edge at an acute angle with the face of it; the tooth is then always sharp and ready for use.] They cut logs sometimes a foot through, and every stroke of the tooth tells towards the job, and never does a tooth get dull, as as far as we can see. Two winters ago some lumbermen encamped near one of their ponds. One afternoon they felled a tree across a lumber road, and before morning it was cut up by the beavers and handsomely piled out of the road.—*Exchange.*

As we all know, some animals are offensive and some are innocent of any intention to offend. The former are abundantly able to care for themselves but the lesser animals must content themselves with "strategy." When bear meets bear then comes the tug of jaw; but when a bear meets a hedgehog aggressive resistance is useless and the assailed must resort to the passive means nature has provided for his safety. The hedgehog accordingly rolls himself up into a round ball and presents on all sides a spicular delicacy which Bruin very wisely declines. The hedgehog can remain in this position for a long time—long enough to wear out the patience of the enemy at least, so that he is forced at length to seek the satisfaction of his hunger in some other way.

We may also chronicle here the habits of the South American "glutton," who crawls out on a branch of a tree and there, awaiting his opportunity, drops upon some unsuspecting ruminator below and forthwith destroys him. When the fox is closely pursued by the hounds he throws them off the scent, for a time, by his cunning; for this, with his legs, is the only protection poor Reynard possesses; he retraces his steps, doubles back and forth, and has been known, on coming to a stream, to swim some distance down it till he could find a path which seemed to afford immunity from danger. By doing so he destroyed, for a time, the peculiar odor which animals exude when hunted, and which, notwithstanding all their cunning and perseverance, furnishes the means of their destruction at last. The rabbit also doubles and tries to elude its pursuers in this way; he makes but a sorry hunt, however, and is soon overtaken and bagged. Wolves possess untiring energy and persistence in the pursuit of food; they have been known to lope on for a whole day, even when entirely distanced by their prey, certain in the end to tire them down; having for their guide the while the scent which the hunted quarry left behind it. Bears trust to "grit," long teeth and a strong hug, to disable their enemies. Lions crouch and spring and beat off nearly all other brutes by their tremendous strength and ferocity. Elephants go in droves or herds, and rely on their trunks, tusks and huge limbs for the means of repelling foes; and tigers sneak and crouch in thick jungles, only to bound out upon some poor native or some wandering ox that has crossed its path, and bear it away to death.

Some animals prey only at night, while others roam the wilderness unchecked by any fear or apprehension of man or his devices. Those whose native haunts are among arid sands and hot open tropical countries, are supplied by nature with the means of resisting the heat and of securing their food. The tiger's feet are armed with a soft ball or cushion on which he steps as softly and as noiselessly as a child in its stockings. Even as these beasts pace up and down monotonously in our menageries, the human ear cannot detect a sound which would warn him of their approach.

The stately giraffe or camelopard, with its mild eyes and awkward steeple-like neck, moves off at a rapid rate when pursued and can find no safety from danger except in its legs. The food of the camelopard is the tender leaves of the mimosa tree, which grow at such a distance from the ground that the animal would starve but for the towering neck which nature has given it. Nature by her providence furnishes all her subjects with some powers of resistance by which they are able to defend themselves. In some cases, as for instance with predatory beasts, muscular strength and ferocity are allied; in other members of the brute creation—those which subsist on vegetable food—we find fleetness of foot or else strong and sharp hoofs and horns; she leaves nothing undone or unfinished but gives to every brute some qualification which enables it to protect itself.

Some of the most talented men in the country have thought it not beneath them to observe and chronicle the habits of the different species of beasts, birds and fishes; and to gratify their passion and subserve the interests of humanity and science they have undergone much personal hardship and discomfort. Every man cannot be an Audubon or an Agassiz, but we may modestly emulate those men by studying, so far as our opportunities permit, the wonders of the animal kingdom; by so doing we shall find that we receive many an instructive lesson which in some way or other has a good effect upon the heart and brain.

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THE "AUTOPHONEON."

[A Report to the Polytechnic Association of the American Institute. Read and accepted, February 12, 1863.]

The committee appointed to examine a new musical instrument, constructed by Joseph Dixon, report that they proceeded to his residence in Jersey City, and were ushered into a music-room in which is placed an automatic organ, called by the inventor an "Autophoneon." The case is eleven feet high, nine feet long, and four feet deep; it has a front of finely-wrought rosewood; but a portion of the apparatus is in the story below, so that the actual hight of the instrument is twenty-one feet. It has a keyboard of five and a half octaves, and twelve stops for the use of an organist. After listening to several "voluntaries," which displayed the fine tones and capacity of the instrument, the organist retired, and the inventor touched a lever, when a series of waltzes and familiar airs followed, with a fullness of harmony and brilliancy of execution which were truly astonishing. The front lid of the instrument was then raised, exposing to view the principal machinery by which these marvelous effects were produced. Above the keyboard was seen a cylinder seven feet three inches in length, and thirty-four inches in circumference. Upon this immense barrel are placed the brass pins and staples which operate the keys of the instrument. The pitch of the sounds depends upon the longitudinal position of the pins or staples, and the length of the sounds depends upon the length of the staples in the direction of the circumference. Above the cylinder is a brass bar extending from one end of the instrument to the other, having on its lower side finely-cut slots, one-half of an inch apart, in each of which a steel finger, fitted with great accuracy, plays in a vertical direction. The number of fingers is one hundred and sixty-six. The advantage gained by this great number of keys is that the instrument gives the complete harmony as arranged for an orchestra; each series of pipes having a separate and independent part. The cylinder contains several thousand pins and staples, or enough to play six hundred and forty bars of music in "two-four" time, with all the parts as performed by a full band. The increased or diminished dynamic effect is regulated by steel fingers, which also set in motion the pneumatic action operating the drums.

The distance between the steel fingers is sufficient to allow eight rows of pins and staples to be placed upon the cylinder, which, by a lateral motion, brings each row in turn under a finger, so that in eight revolutions of the cylinder each finger has traversed a path of pins 272 inches in length; this number, multiplied by 166, shows that the whole distance traversed by all the fingers is 3,762 feet and 8 inches.

Ten cylinders have already been made, and the pins and staples have been arranged on four of them. The work is done by first covering the cylinder completely and firmly with white paper, on which, by means of the fingers and a graduating machine, the position of the pins and the length of the staples is marked. After the pins and staples have been driven into the wood to the proper depth, the paper is removed. The time required for arranging the pins and staples on one cylinder is three months. In order to obtain a perfectly smooth and uniform surface, presenting everywhere the same arrangement of grain for holding the pins, it was found necessary to construct the cylinders from solid logs. The basswood trees required were cut at the right time in the forests of Schoharie county; and after proper seasoning were bored, so as to leave a shell of about three-quarters of an inch thick, by machinery especially constructed for this purpose at a cost of several hundred dollars. The cylinders are highly polished and have their ends enclosed by brass disks, of diameter sufficient to form a protecting rim; connected with these disks are the axles on which, when in place, the cylinder revolves. The linear extent of the ten cylinders, placed end to end, exceeds seventy-five feet.

A weight of 300 lbs., which is so geared as to be easily moved, is raised to a hight of 11 feet; and, when connected with the cylinder, causes it to revolve for about one hour and a half. The speed is regulated by a fan wheel. The bellows, which supplies the pipes with wind, is placed in the story below and operated by a novel hydraulic apparatus, which is self-acting, that is to say, its valves are tripped internally, faster or slower as more or less wind is required; the bellows itself always directing the movement. A correct idea of this ingenious contrivance cannot be given without drawings.

It only remains to speak of the pipes. They have been constructed with great care, a large number having been rejected after subjection to a trial. The points satisfactorily attained are correct imitations of the sounds of not only the wood and brass instruments but also of the stringed instruments of the orchestra. Having perfected this part of the "Autophoneon," the inventor is able to give the correct interpretation of all written music. For instance, the complete overtures of "Don Giovanni" and "Figaro" are played with surprising sweetness and power. The slow and solemn anthem and the exciting music of the dance are equally within its range and capacity. It not only executes the most rapid passages but adds those peculiar effects which can only be produced by contrasts in the *timbre* and dynamics of sound.

Eight years have elapsed since Mr. Dixon commenced the construction of this instrument for his own use; and the cost thus far is nearly ten thousand dollars! Instruments somewhat similar to this belong to several of the crowned heads of Europe, but they are all of inferior size. It is a matter of especial gratification to every American that the largest automatic musical instrument ever constructed has been planned and completed by a single enterprising fellow-citizen, who, in following the bent of his genius, has demonstrated how far machinery, which already has the credit of doing the drudgery of the world, can be made to minister to our more refined tastes. Respectfully submitted,

JOHN B. RICH, Chairman.

Paganini's Violin.

While examining and talking with the officer (who was very polite and interesting) about this beautiful work, he accidently happened to remark that the veritable violin belonging to Paganini was locked up in a secret closet of the room in which we then were. We begged him to let us have just one peep at it; so he obligingly procured the key, and took out the glass case containing the old violin with its broken strings, there being only one whole one; and I thought, who knows but what this is the very one upon which he produced such wonderful harmony as to touch every heart with sounds more soul-stirring that have ever since been heard? By the side of the violin lies the box in which he kept it, with "Paganini" in gilt letters upon it. Several seals fastened a blue ribbon to the violin to which a paper was attached. This, we were told, was the city stamp, as it had been found necessary to take every precaution against the possibility of its being stolen, which had been attempted many times. Therefore they keep it locked up so secretly.

Paganini was a native of Genoa, and his daughter (who, I am told, is very rich) wished to purchase her father's violin of the Government at any price, and she earnestly desired to own it, but the Government would not grant her request, saying if by any turn of fortune she should ever come to want, this valuable violin might be sold and perhaps taken away from their city, but, if they kept it, here it would be. I asked what "make" they supposed it to be. The officer said that, a year ago, a celebrated French violin-maker from Paris came here on purpose to see it, and, if possible, make one like it. He begged hard to be allowed to take it out of the glass case or rather globe in which it is kept, that he might take it in his own hands and examine it, but this privilege could not be granted upon any account; so our officer said he came every day for seven days, and examined it, taking measure as well as he could from the outside. His opinion was that it was an old violin of some German make. The officer who so kindly showed us the violin was an old man, and related many highly interesting anecdotes of the great violinist. He said that in his youth he went twice to hear him play in the great theatre in Genoa, and never would he forget the tones which came from that violin; sometimes the whole audience would be in tears, as the sympathetic artist made his instrument fairly moan through the immense building, almost rending the hearts of all who heard it. Then, in a moment, the whole house would be in a roar of laughter at his "Carnival of Venice," and his spirit and manner would enliven the most grave and sedate. Truly this is genius; this is art, such as few artists have ever attained to. Although he frequently played in Genoa, still (as the old man told us) he never could be heard for less than ten francs, and the poor soldiers often denied themselves other amusements to save up money to be able to hear Paganini. The house was always thronged when he played, and he made a large fortune, which he left to his children. Locking up the closet, the old gentleman remarked that it was very seldom visitors ever saw this treasure, as they had so much trouble to keep it they did not show it to everybody. I thanked him heartily, telling him I never could, as I know I never shall, forget that I had seen Paganini's violin.—*Milan Correspondent of the Chicago Journal.*

Gratuitous Advice to the Navy Department.

The British steamer *Princess Royal*, recently captured in attempting to run the blockade of Charleston, is reported to have on board the materials for plating a vessel of war, and an English mechanic who is familiar with the plans designed to be used. Our advice to the Navy Department is to adopt the plans and materials of our enemy without delay. They are probably much better than any that the dull heads and lukewarm hearts of some of our "practical naval constructors and engineers" have the capacity to produce. Let the Secretary of the Navy bear in mind that it was the rebels who first taught us the value of plating vessels with iron, while our own chief naval constructor pronounced it "a humbug;" and for once act upon our advice, without reference to the opinions of persons whose loyalty is not any too fervid. A moment's reflection will convince the honorable Secretary that the rebels, considering their limited means, have performed wonders upon the sea, and that any designs of theirs, in reference to future operations, are entitled to prompt consideration. The English mechanic who was captured in the *Princess Royal* is our prisoner, and as he came in her to work for pay, we have no doubt he will work for us as readily as he would have done for the rebels. But we warn the Secretary not to submit our advice to the Bureau of Construction, for that venerable body are too long-winded and too lazy to comprehend the value of anything which does not originate with themselves. As a specimen of their want gumption, we state that a vessel now in course of construction in Charlestown (Mass.) navy yard, though partly planked, has not yet been fully designed. The whole of her plans have not been forwarded from Washington, so that her talented and scientific builder, Mr. Hanscom, is yet in the dark concerning many important parts of the work which are neces- to make her complete.—*Boston Commercial Bulletin.*

The Twinkling of the Stars.

According to M. Arago, astronomers and others have failed to arrive at a satisfactory explanation of the twinkling of the stars, on account of their failure to give an exact definition of the term "scintillation." He affirms then, that, in so far as naked eye observers of the heavens are concerned, scintillation, or twinkling, consists in very rapid fluctuations in the brightness of the stars. These variations are always accompanied by variations of color and secondary effects, which are the immediate consequences of every increase or diminution of brightness; such as considerable alteration in the apparent magnitude of the stars, and in the length of the diverging rays, which appear to issue in different directions from their centers. It has been remarked from a very early age that the phenomena of twinkling is accompanied by a change of color. It is asserted that the name of Barakeach, given by the Arabians to the star Sirius, signifies the star of a thousand colors. M. Arago also asserts that the planets twinkle.

STEEL SHIRT-COLORS.—A Portland tailor advertises a very beautiful article of enameled steel shirt-collars, manufactured at Sheffield, England. They can hardly be distinguished from the paper collars, so fashionable, and will no doubt entirely supersede them. If they become soiled, you have only to sponge them to restore their whiteness. The use of cotton in the manufacture of shirt collars is at an end.

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The Distillery Business---Malting.

[Continued from page 134.]

The object of malting is to form diastase. This substance, dissolved in water and mixed with dextrinified starch, has the property of converting this dextrine into sugar, when a certain temperature is applied to the mixture. This process is called saccharine fermentation. The decomposition of the thus-formed sugar into its two parts, carbonic acid and alcohol (whisky) is called alcoholic or vinous fermentations. The conversion of starch into dextrine is called dextrinification.

The grains or cereals consist more especially of two principal substances—starch and gluten or vegetable albumen. When moistened, the grain begins, under favorable circumstance, to sprout or to germinate, and a chemical change begins to take place. The gluten is then changed, among other products, into a white, soluble substance called diastaste. In germinating barley, or any other grain, the quantity of created diastase varies essentially, corresponding with certain circumstances, as stated below, and it is therefore of the highest importance to inquire how the greatest quantity of diastase can be produced in the smallest quantity of grain.

Here we must state, in the first place, that, after many careful experiments, it has become an established fact that 100 parts of dextrinified starch, to be transformed into sugar, requires, at a temperature of 151° Fah., $33\frac{8}{100}$ per cent of rye malt, $33\frac{3}{100}$ per cent of wheat malt, 35 per cent of oat malt, $30\frac{8}{100}$ per cent of two-rowed barley malt, and 29 per cent of six-rowed barley malt. It appears from this, and practical experience has proved, that six-rowed barley is the best kind of grain for malting purposes.

In the second place, there is more or less diastase produced, according to the different degree of growth which the grain has attained.

1. Suppose the roots of grain are grown half as long as the grain itself, then there are 116 per cent of such malt required to transform 100 parts of the dextrinified starch into sugar.

2. Suppose the roots of grain are grown as long as the grain itself, only $47\frac{8}{100}$ per cent of malt are required to transform 100 parts of dextrinified starch into sugar.

3. Let the roots of barley be grown one and a half times as long as the grain itself, then 100 parts of dextrinified starch are transformed by 26 $\frac{6}{100}$ per cent of malt.

4. If the roots are grown twice as long as the grain itself, 33 per cent of malt will be necessary to convert 100 parts of dextrinified starch into sugar.

Hence it is seen that the malt of six-rowed barley, which is germinated until the roots are from one and a half to twice as long as the grain itself, is best. The quantity of diastase, as already stated, is not always the same in germinated grain. It will increase to a maximum and decrease to a minimum until it entirely disappears. The moment the stem of any grain appears by breaking through the tegument or skin of the grain (the grain is graminating), the diastase will be consumed by degrees, because, during the first period of its appearance and life, the stem lives exclusively on diastase and sugar prepared accurately by nature for its food.

Another remarkable fact deserves to be noticed. The more roots a germinating grain produces, the more diastase will be created. Thus, wheat and rye malt, putting out only three or four roots, contain less diastase, while barley malt, with five or six roots contain more; the quantity corresponding exactly with the number of roots produced in each case. The faster grain germinates the fewer roots will be produced and the sooner does graminating take place.

Moistening germinating grain is a very wrong practice, because graminating is then accelerated just as much as when the temperature of any germinating grain rises above a certain degree, as when daylight, or, what is worse yet, the beams of the sun strike it. Hence, any germinating grain, whose temperature has risen to 63° or 66° Fah. should at once be worked so as to lower the temperature and arrest in this way the growth of the stem (the graminating); and hence, too, the malster's guide should never be time, but the thermometer. Diastase is a very delicate substance. Exposed to a temperature of 167° Fah. it will be destroyed in the main, while a temperature of 212° Fah will destroy all of it.

All the component elements required for a saccharification are present in malt, viz., moisture, starch, diastase; and as soon, therefore, as the requisite temperature is applied, the saccharification sets in and part of the diastase is consumed. But this consumption of diastase is not the object of malting for distillery purposes, because the distiller needs all his diastase for the saccharification of the mash. Hence we must be very careful in drying malt on the kiln—preventing, in the first place, the diastase from being destroyed by too high a temperature, and, in the second place, avoiding any reaction of it on the starch in the malt grain.

These few hints (perhaps never known to many distillers and malsters), we suppose, will show sufficiently how much knowledge and experience is required in making a good and powerful distillery malt, how carefully a malster should proceed, and of how much importance the malting process is, as an inferior malt will cause an imperfect saccharine fermentation, and make an inferior yeast also.

A good deal remains to be said in regard to what constitutes the best kind of malt. We will be, for the present, as short as possible in this connection, making merely the following statement:—

1. That good malt for distillery purposes must not taste sweet, but should be *jejune*—that is, tasteless.

2. Malt grain, when cut between the teeth, should not appear vitrous or brown.

3. Every grain of barley malt should have five to six roots, of wheat and rye malt three to four roots, the roots in both cases being one-and-a-half to two times as long as the grain.

3. The grain should not be shrivelled—a sign that it has been exposed to a temperature too high, especially in the commencement of drying on the kiln.

In conclusion, let me call particular attention to a fact which I have sought to elaborate all through this article, namely, that the process of drying malt on a kiln or in the air is unprofitable, and should be abandoned by practical distillers. The process of drying neither augments the quantity of diastase in the malt, nor does it make the diastase more effective, but, on the contrary, it generally proves injurious to its saccharifying quality. It is, besides, very expensive, requiring the establishment of a kiln, and further, a constant expenditure of money for labor, repairs and fuel.

Now, all these difficulties are obviated by the use of malt in its *green* state, and the intelligent distiller will at once comprehend the advantages which a correct and careful production of malt and its use in the green state, just when the diastase has arrived at its highest point of development, must necessarily secure.

[To be continued.]

Breech-loading versus Muzzle-loading Guns.

Messrs. Editors:—The advantages of rapidity in loading fire-arms are so apparent, and the settlement of the principle so conclusive in the adoption of the revolving pistol in preference to the single-loader by the people and by the Government in the army, that it would appear to be no longer an open question. Such, however, is not the case. General Ripley, Chief of the Ordnance Department at Washington, opposes their introduction into the army, and has recently said that he prefers the old flint-lock musket to any of the modern improved fire-arms, and that he believes nine-tenths of the army officers will agree with him. It is not, therefore, surprising that there is doubt upon the subject by the great mass of the people, who have not the proper means of investigating the matter. Hence, a few considerations of the question may not be out of place at this time.

The chief properties of a good gun are accuracy, power, and rapidity of loading. Accuracy depends mainly upon the weight of the barrel and the finish of the bore. The greatest accuracy is attained by the target-rifle, the barrel alone of which weighs from ten to twenty pounds, and sometimes even forty pounds, with a thickness at the muzzle equal to the diameter of the bore. This makes a weapon entirely too heavy for the masses of an army, and one which can only be made available to a limited extent for sharp-shooters. As all reductions of this weight are at the expense of accuracy, no such accurate results can ever be obtained from a barrel light enough for general use in an army. Power depends upon the quantity and quality of the powder used. Both of these properties are entirely independent of the mechanism or working parts of the gun, by which rapidity of firing is attained. The time of firing and aiming, or taking sight, is the same in all guns. By "guns" we mean all those classes of small-arms known as rifles, muskets, carbines, &c. Hence, to attain rapidity of firing is to reduce the time necessary to load; and for this purpose breech-loaders have been introduced, and to this point all inventors have turned their attention. All patented inventions are confined to the mechanism of the lock and frame, and appurtenances for loading and closing the breech. I know of no invention applying to the barrel or charge; any form of barrel or proportion of charge are common property. The aiming or taking sight will vary only with the skill and expertness of the operator.

I divide the guns into three classes—first, muzzle-loaders; second, single-shot breech-loaders, or those which have to be raised to, and lowered from, the shoulder, to be reloaded at every discharge. This latter is a numerous class, of which "Burnside's Rifle" may be taken as a specimen for illustration. The third class are the repeating breech-loaders, or magazine guns, which can be placed at the shoulder and fired fifteen times, more or less, without removal. This is a very small class, and we take for illustration "Henry's Repeating Rifle."

The muzzle loading gun requires sixty seconds to load and fire; Burnside's can be loaded and fired fifteen times a minute, or an average of four seconds to every shot. The Henry rifle can be loaded and fired thirty times per minute, or an average of two seconds for each shot. These are the claims of the advocates of each of these varieties, and are understood to mean the actual time for loading and firing, without any allowance for taking sight.

We assume that each of these styles of arms are of equal force and accuracy, as they may be, if they are not. Thus, if any muzzle-loading gun has a barrel carrying a charge giving better results than Burnside's rifle, Burnside has only to adopt that barrel and charge to have an arm of equal power and accuracy. If Burnside uses a barrel and charge giving better results than any other, Henry has but to adopt his barrel and charge to produce results equal to the best. Allowing, then, four seconds for aiming or taking sight, and we get from each muzzle-loader one shot in sixty-four seconds; from Burnside's one shot in eight seconds, or eight times more effective power in rapidity than we get from a muzzle-loader. From the Henry rifle we get an average of one shot every six seconds, or eleven times the same effective power in rapidity.

Now, place two bodies of men in the field, in numbers and in all other respects equal, and arm one with a muzzle-loading gun, and the other with Burnside's rifle; can there be any question about the result of a conflict? Or place a body of men armed with the Burnside rifle against double their number armed with the muzzle-loader, and even then can the result be doubtful, when the former have a target twice as large as their opponents? How much greater, then, would be the advantages of a body of men armed with a gun that can be loaded and fired twice as rapidly as Burnside's? A magazine gun like the Henry rifle, carrying fifteen charges, which can be refilled in fifteen seconds, and the fifteen shots fired with deliberate aim in sixty seconds, or fifteen times before the enemy could reload once, must produce a sheet of fire and lead before which no troops could stand to receive the last shot.

The only reason, or excuse rather, we have ever heard against the use in the army of arms susceptible of such rapidity of loading is that the troops would waste the ammunition. Will this bear the test of examination? Consider that it is admitted that, in the use of muzzle-loading guns, but five per cent of the shots would take effect, showing a loss of ninety-five per cent of the ammunition! Can a greater waste be well expected under any circumstances?

Thus far we have looked at the subject from a

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mathematical point of view only. Now, as to the moral effect upon those armed with such terrible weapons and upon those opposed to them armed with such comparatively defective arms. If, as we think, it is a consciousness of power that makes men brave, and a sense of imminent peril that "makes cowards of us all," and oftentimes strikes with panic the best armies, is it not reasonable to suppose that such a weapon would give a soldier the courage and coolness needed to send each of his fifteen shots with more unerring certainty than his trembling opponent could send his single shot? If, *to save ammunition*, it is essential that every soldier should remain for sixty seconds while re-loading, a helpless target, to receive his opponent's fire of from one to fifteen shots, why not reverse the order of progress and turn the ingenuity of inventors to the production of a gun that will require twice the length of time or more to re-load, and thus *double the saving of ammunition?* Saving of life does not appear an element worthy of consideration in this connection. Yet this is West Point opinion—the deductions of West Point science! Are these results worth their cost to the country?

There are other qualities requisite in a good, ram such as simplicity of construction and durability. Every inventor of a new improvement in fire-arms claims for his particular gun both of these advantages. As it is not our purpose to decide between them or any particular weapon, we leave those points without discussion. It is simply the principle involved in the rapidity of loading; believing that all time unnecessarily spent in loading is time lost, and that the most perfect arm—everything else being equal—is that which can be loaded with the greatest rapidity. O. F. W.

Tea in Russia.

The Russians attribute the superiority of their tea to the fact that it is sent overland from China, and does not get spoiled by the sea air. I should be inclined to think that the real reason is that it comes from provinces in China near the Russian frontier, where there is a better growth of tea than in the provinces from which comes the article we use. I think, also, that they understand infusing the tea better than we do. They drink it as soon as the boiling water is poured on it, whilst we allow it to stand until it becomes as black as one's hat and as bitter as hops. The gentlemen mostly drink their tea in tumblers, without milk, sometimes adding a slice of of lemon, whilst the ladies take it in cups, with any amount of cream. We were afterward, especially when traveling on the Moscow and Nijni railroads, surprised at the large and constant use of this beverage at all hours of the day and night, but we very soon became as large consumers of it as the native Russians themselves. Indeed, after a night in the railway-carriage, we found a tumbler of tea in the early morning more exhilarating than the "blest sherbet," and more refreshing than even hock and soda-water. When at St. Petersburg, we sought a small quantity of a fine sample of caravan tea, for which we paid at the rate of thirty-eight shillings the pound (about ten dollars), but of course this was one of the fancy sorts, and not that which is in common use, which costs about six shillings and sixpence the pound. At the shop where we bought this tea we were informed that they had some as high as seventy shillings the pound. As we were accompanied by a resident in the city who always dealt there, we knew that we were not being victimized.—*Bentley's Miscellany.*

The Mint at Philadelphia.—The commissioners for making trial of the gold and silver coinage of the United States, for the year 1863, are Professor Joseph Henry, Smithsonian Institute; Charles D. Drake, Esq., St. Louis; Professor Agassiz, Harvard University; Hon. Edward Everett, Massachusetts; T. S. Bell, Esq., Louisville, Ky.; Dr. S. M. Smith Columbus, Ohio; Professor John Torrey, New York; and Professor J. H. Alexander, Baltimore. The *ex-officio* commissioners are the U. S. Judge and U. S. Attorney for the Eastern District of Pennsylvania, and the Collector of the port of Philadelphia.

There are in Switzerland 1,483,298 Protestants and 1,040,469 Catholics.

Curious Relics of Old Egypt.

An interesting feature in the Museum of Egyptian Antiquities (recently founded by the Pasha in a commodious house overlooking the Nile) is an addition of gold ornaments discovered by accident at Gournon, Thebes, by some boys, in ground unmarked by any tomb; the fine mummies upon which they were placed passed into the hands of the Pasha of Keneh, who was induced to deposit them in the viceroy's museum. The mummies were unwrapped and more than twenty-five pounds weight of gold ornaments found upon them. The series of necklaces, with figures of jackals in gold, and the golden bracelets, enriched by enamel colors, are extraordinary works of art, as well as of great intrinsic value; one of them is very remarkable, having the sacred hawk for its central ornament holding the emblem of eternal life; its surface is brilliantly colored in *cloisonne* enamels. A hatchet of gold, with a hunting scene embossed on the blade; a mirror, with a heavy lotus-shaped handle of gold; and a large variety of minor decorations for the person crowd this unrivaled case of antiquities. Two small models of funeral boats, with the rowers all formed of silver, are even more precious in the eyes of the Egyptian student from their extreme rarity. The room is appropriately decorated after the style of the tombs at Beni Hassen, and the whole arrangement honorable to the viceroy and his curator. As he is still prosecuting new researches and has prohibited wanton mischief to monuments or the exportation of antiquities, he promises a useful guardianship in future over those interesting remains.

Live Temperately.

Americans as a people are prone to eat too much and too fast. The advantages of temperate living are well set forth in the following paragraphs:—

Solomon tells us that the glutton shall come to poverty; warns us not to be among riotous eaters of flesh; and even bids us to put a knife into our throats if we be men given to appetite. Is there no less desperate remedy?

Jefferson says that "No man ever repents eating too little."

Sir Isaac Newton very often dined on a penny's worth of bread.

Abernethy cured his indigestion and regained his flesh by going into the country, where he was able to get good milk and eggs, and living upon it three times a day, with no drink but ginger-water. On this quantity of food he regained his flesh and uniformly got better.

Marion and his men waxed strong and valiant with no food but sweet potatoes, no drink but water, and no shelter but the sky.

Besides brown bread, the Greek boatmen subsist almost solely upon their native fruits—figs, grapes and raisins. They are the most nimble, active, graceful, cheerful and even the merriest people in the world.

Grant Thorburn attributed his cheerful old age to the fact that he "never eat enough," and thousands of his countrymen are wearing out their bodies not so much by the excess of business or the multiplicity of cares, as by the over-work that they crowd upon them in digesting surplus and unnecessary food.—*Exchange.*

New Scarlet Dye.

A new scarlet dye of great richness is attracting considerable attention in Canada. It is prepared from an insect, a species of *coccus*. This new dye closely resembles true cochineal—a most expensive coloring matter, capable of being produced in warm countries only, and which is employed to give a fine and permanent dye in red, crimson and scarlet, to wool and silk. Unlike cochineal, the new dye is a native product, and capable of being produced in temperate countries. Having been but recently observed, a sufficient quantity has not yet been obtained to make a complete series of experiments as to its nature and uses; but the habits of the insect, as well as the properties of the dye, seem to indicate that it may become of great practical importance. In color it closely resembles ordinary cochineal, having rather more of the hue of the *adonis autumnalis*, and no doubt is entertained that other shades will also be obtained.—*Massachusetts Plowman.*

The Pacific Railroad.

The famous "war of the guages," which agitated Great Britain several years ago, is renewed here on the establishment of a gage for the great Pacific Railroad. Senator Fessenden advocates a 6-feet gage, and Senator McDougal is of the opinion that a 5 feet 6-inch gage would be best adapted to the turns and grades of that portion of the road leading across the mountains. In a recent debate on the subject Senator Harlan said:—

"There are 3,369 miles of railroad in New England, all of which are established on a gage of 4 feet 8½ inches, except one road, the Atlantic and St. Lawrence, of 149 miles in length. In New York there are 2,709 miles of railroad completed, all of which have the gage of 4 feet 8½ inches. New Jersey has 560, Pennsylvania 2,540 and Ohio 2,999 miles, all of which are established on a gage of 4 feet 8½ inches or 4 feet 10 inches, so that cars on one shall be able to run on the other. Missouri has 817 miles, of which 207 are on a gage of 4 feet 8½ inches, and the residue on a gage of 5 feet 6 inches. Maryland has 380 miles and Delaware 136 on a gage of 4 feet 8½ inches. Kentucky has 570 miles—except about 100—which are on a gage of 4 feet 8½ inches. The Baltimore and Ohio Railroad, leading from Washington to the Ohio river, through Western Virginia, is on a gage of 4 feet 8½ inches. There are now completed in the United States 1,199 miles of railroad which are on a different gage, and 20,567 on a gage of 4 feet 8½ inches. Those that are different from this gage have cost the owners $60,000,000, and those that are on this gage have cost $849,000,000."

Hours of Labor required of Railroad Employes.

The hours of labor exacted by some of the Brooklyn railroad companies are so many and the work is so severe that it is astonishing that men can perform the labor and live.

The Brooklyn Central Railroad Company require seventeen and a half hours of labor, and allow no time for procuring meals; the food necessary to sustain life being eaten in the cars. The compensation for conductors and drivers is $1 35 per day.

The Brooklyn City Railroad Company exact but thirteen and a half hours' service, allow twenty minutes for dinner, and compensate their conductors at $1 50, and their drivers at $1 38 per day.

The Brooklyn and Newtown Railroad Company require about twelve hours of labor, allow ten minutes for dinner, and compensate their conductors and drivers at $1 50 per day.—*Exchange.*

Bad for the Generals.—Senator Nesmith, of Oregon, in speaking recently of the necessity of more discipline, vigor and activity in the army, and the evil of having so many officers off duty, said: "We see thousands of them about the streets here, and in Willard's Hotel they are tucked up in feather beds like heroes with their martial cloaks around them. Some one told me that he threw a rock at a lame dog at Willard's the other night, and knocked down two Brigadier-Generals; and it was not a good night for Generals either!" The same Senator also advocated that members of Congress should not be exempt from the military conscription law; suggesting that they might be useful in stealing Richmond or the Southern Confederacy, if they were left out over night.

The last sensation in Paris is a man who has a perfect genius for making and fitting women's dresses. He is called the "pontiff of the petticoat." He not only makes ladies' dresses, but he puts on the ladies' dresses. Sometimes as many as fifty carriages are in front of his door at the same time, the feminine owners being up stairs having their dresses put on, as a dress should be put on. For cutting a dress he charges $10. When dressing a lady, he charges $15 for "fitting" her for a dinner, and $25 for an evening party.

A Rare Bird.—It seems that there is one inspector who won't wink at the rascality of contractors. A few days since, a New Jersey shoe manufacturer had a lot of shoes returned on his hands, with a large hole cut through the bottom of every one, so as to effectually preclude the possibility of their subsequent acceptance by any less conscientious inspectors.

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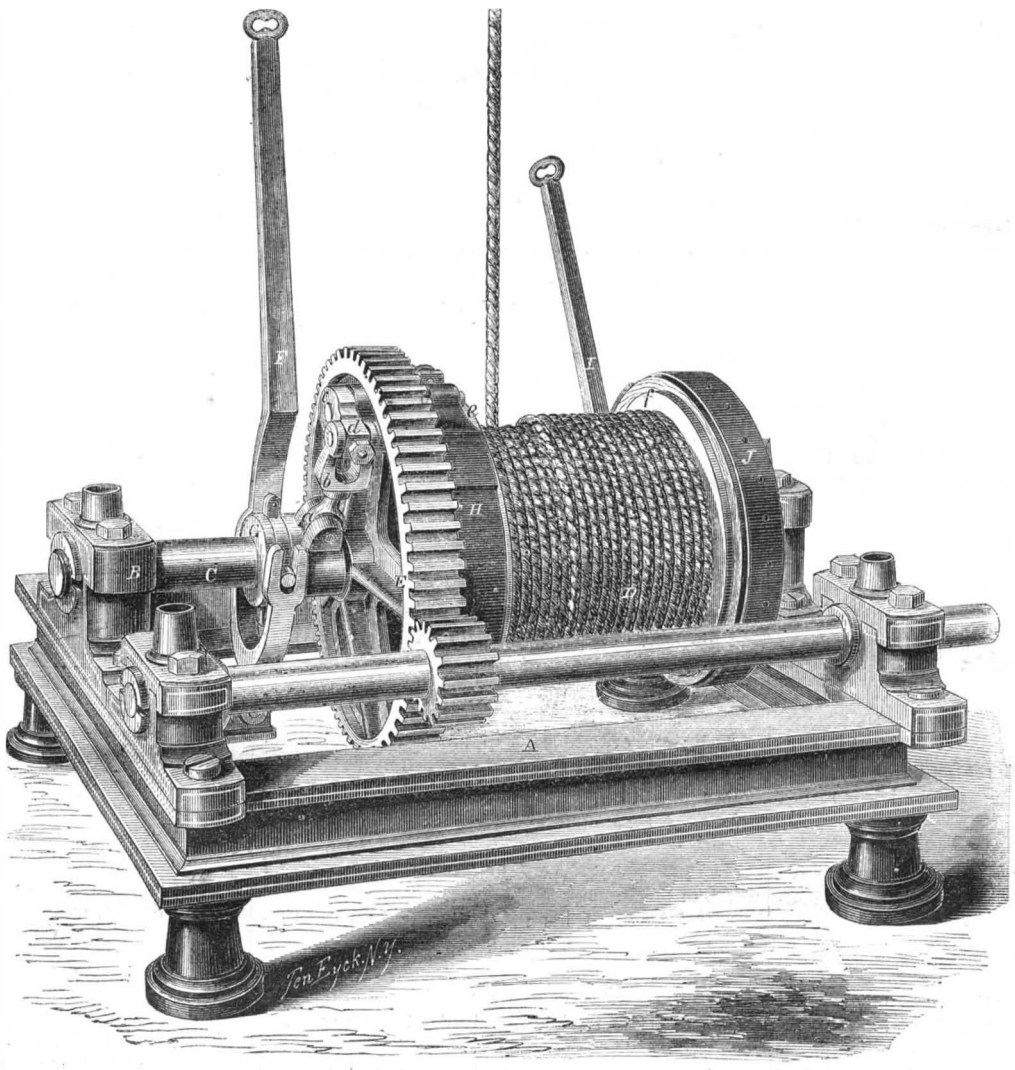
Improved Friction Brake.

In manufactories, mines and other situations where hoisting machinery is employed, it is desirable to have some apparatus whereby the motions of the weight hoisted can be under proper control. This is particularly the case in coal or other mines where men are raised from or lowered to the bowels of the earth; should the engine which hoists them give way suddenly in any part, they would either be thrown out or else descend with such violence as to endanger their lives; indeed, in almost every mechanical operation, some such machine is necessary. The machine herewith illustrated is a very efficient apparatus for the purpose, being easy of access in all its parts, strong and very reliable. It consists in detail of the following parts:—The bedplate, A, has the pillow blocks, B, bolted to it, in which the main shaft, C, carrying the drum, D, and the spur wheel, E, revolves. The lever, F, is jointed at the bottom and secured to a coupling, G, on the main shaft; one end of this coupling has a jaw, *a*, worked on it, which receives the end of the toggle arm, *b*, the other end of the toggle is connected to the short lever, *c*, by the square block, *d*, which works loosely on the end of the lever. This lever is further connected by a short shaft and a crank or eccentric pin, on the opposite end, with the friction brake, H. The brake is lined with wood and works in a reciss formed for it on a pulley, one edge of which is shown at *e*. The handle, I, seen at the opposite end of the machine, has a joint at the bottom where it is jointed on the frame, and also another short toe which is secured to the strap, J, encircling the wheel, *f*. The works to be hoisted or lowered is done through the medium of the rope. The drum on which the rope is wound revolves independently of the coupling apparatus, the latter can be thrown out of connection with the work hoisted, instantly. By moving the lever, F, in the direction indicated by the arrow, the coupling follows it, and by drawing down the short arm, *c*, relaxes the pressure of the band upon the pulley, and consequently permits the drum to revolve alone; when, however, it is in the position shown in our engraving, the force exerted by the compression of the band, through the agency of the joints and lever, is sufficient to impart the power exerted on the spur wheel by the pinion to the work in hand. Therefore, by simply throwing the lever forward or back, as occasion requires, the elevation becomes continuous or is intermittent; the lesser brake affords, through friction, a means of guarding against accident should any part of the machinery give out. Several modifications of this principle may be adopted, whereby two shafts may be coupled together without shock or jar, and without cessation on the part of the prime mover; also changes in its construction which permit of stopping or starting lathes or other tools, without the intervention of a loose pulley.

This friction gearing is in use on the hoisting apparatus of the Hudson River Sugar Refining Co., Havemeyer, Townsend & Co.'s refinery, Brooklyn, and at other large manufactories in New York city and its vicinity. Further information may be had by addressing A. & F. Brown, patentees and manufacturers, 125 Mott street, New York.



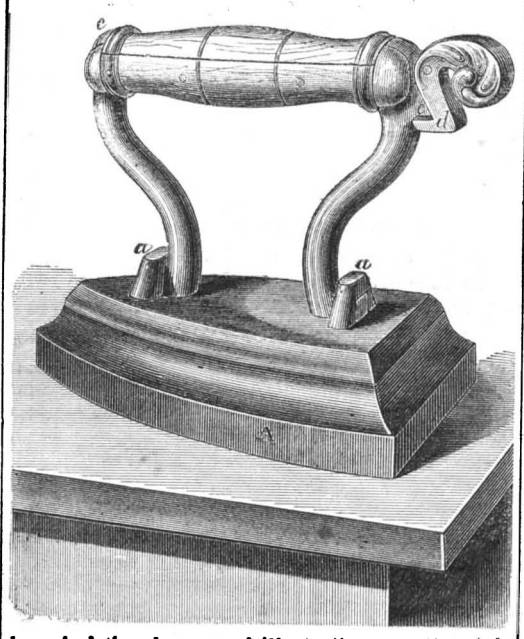
A. & F. BROWN'S PATENT FRICTION BRAKE.

Steam on City Railroads.

We are gratified to observe that the Brooklyn Central Railroad Company have petitioned the Legislature at Albany for the privilege of adopting the dummy engines on their road. We hope they will convince that body of the propriety of acceding to their demand, and that, having obtained the necessary permission, they will stock their line with the best possible machines of the class. Surely when we can have our cars drawn and warmed by steam, there is no longer any excuse for shivering in discomfort or for employing horse or mule power in the place of the all-conquering steam.

CHRISTY'S PATENT SAD-IRON.

A great many little conveniences and comforts to the housewife have been already invented, and we have had the pleasure of illustrating a majority of them in the Scientific American; we hope they will increase and multiply rapidly, as the labor saved by them is almost incalculable, and they generally are the best class of patents on which to make money. The sad-iron which we herewith illustrate is not a labor-saving contrivance, but is an exceedingly ingenious arrangement to preserve the hands from injury by the heat of the iron—obviating the necessity of using a holder to shield the hands from injury. A brief description will render its construction and operation very clear. The iron proper, A, has two small eyes or staples, *a*, cast on each end, in which the square ends of the handle are inserted; this handle is split in half, and has a joint at *c*, and a catch or hook, *d*, which engages with the shoulder, *e*; this catch is also jointed; by unhooking and raising it the upper half of the handle lifts with it, and disengages the forward leg from the staple, *a*. The advantages of this device are manifold. The appearance of the iron is much improved, and the cost of it diminished, as one handle will suffice for a dozen or more irons; moreover, as the handle is detached from the base, when the same is heating, no "holder" is required. The grip of the handle is constructed of wood or any other non-conducting substance, and is not in contact with the hot iron sufficiently long to acquire an inconvenient temperature.



This invention was patented through the Scientific American Patent Agency, Feb. 25, 1862, and further information may be obtained by addressing the patentee, John Christy, Baltic, Conn.

The "Keokuk."

This vessel has made two ineffectual attempts to get out on a trial trip, but has been prevented, in both instances, by mismanagement. On the last trip the boilers primed so badly that the engines were unable to work to any advantage, and she finally put into the navy yard, having been just one hour and a half in getting there from the foot of 11th street (East river). It would save the press, generally, much valuable time if the engineers would see that their machinery is in order before notifying editors to be present. We spent the best part of two days in pacing the *Keokuk's* deck, and were obliged to return home disappointed at last. The contractor, Mr. Whitney, has, we believe, done all that he could to forward the interests of the Government.

A CHANCE FOR THE INGENIOUS.

Under this head we lately called the attention of our readers to the evident want, on board of our naval vessels, of some machine or contrivance for quickly cutting off or removing piles from rivers, this being the favorite mode adopted bo the enemy to prevent the approach of our gunboats. Mr. Van Horn, of Springfield, Mass., who, by the way, is one of our most talented engineers, writes us that he used an apparatus last year in cutting off the piles for the railroad piers at Havre De Grace, Md., which would do the work at a depth of from five to forty feet. We were aware that devices existed by which piles could be cut; but we believe that there is none that is sufficiently compact, light and simple, to be carried and operated from on board our ironclads; and we think that inventors have a clear field in this respect. There is no limitation as to the mode of removing the piles.

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NEW YORK, SATURDAY, MARCH 7, 1863.

WHAT CAN BE DONE FOR INVENTORS—ADVICE GRATIS AND ADVICE FOR PAY.

For the information of our new subscribers, we would state that it is the custom, at the office of this paper, to examine models or drawings and descriptions of alleged new inventions, and to give written or verbal advice as to their patentability, without charge. Persons having made what they consider improvements in any branch of machinery, and contemplating securing the same by Letters Patent, are advised to send a sketch or model of it to this office. An examination will be made and an answer returned by early mail. Through our Branch Office, located directly opposite the Patent Office in Washington, we are enabled to make special examinations into the novelty and patentability of inventions. By having the records of the Patent Office to search, and the models and drawings deposited therein to examine, we are enabled to give an inventor most reliable advice as to the probabilities of his obtaining a patent, and also as to the extent of the claim that it is expedient to set up when the papers for an application are prepared. For this special examination at the Patent Office we make a charge of Five Dollars. It is necessary that a model or drawing and a description of the invention should accompany the remittance.

The publishers of this paper have been engaged in procuring patents for the past SEVENTEEN years, during which time they have acted as Attorneys for more than TWENTY THOUSAND patentees. Nearly all the patents taken by American citizens in FOREIGN countries are procured through the agency of this office.

Pamphlets of instructions as to the best mode of obtaining patents in this and all foreign countries are furnished free on application. We also publish a large pamphlet containing the PATENT LAWS of the United States with a digest of facts relative to the rights of inventors and assignees. This pamphlet is important to every person who owns a patent or is about to apply for one. Sent by mail on receipt of six cents.

For further particulars as to what can be done for inventors at this office, see advertisement on another page, or address MUNN & Co.,
No. 37 Park Row, New York.

A GRAND CONTINENTAL RAILROAD.

We have a railroad system, so far as the engines and cars running upon rails is concerned, but as it relates to uniformity in the character of our railroads, there is a decided want of system. In the construction of machines and articles for public use, every sensible manufacturing company adapts machinery to form the separate parts of their productions, so as to obtain exact duplicates, in order that new parts may at any time be fitted. The railroad companies existing in different States have not exhibited this wise disposition in the construction of their several lines. In the Atlantic and several of the interior States, the narrow gage of 4 feet 8½ inches width prevails, excepting the New York and Erie Railroad, which is a magnificent six-foot track. In Ohio the gage is 4 feet 10 inches, and in several other States there are five-foot gages. In consequence of this want of uniformity in our railroads, special locomotives and cars are required for each gage, hence we have no general railroad, and a change of cars is required wherever the harlequin gages conflict. We have advocated a uniform system of tracks so as to secure a grand national highway on the rail, from the Atlantic to the Pacific. The grandeur and benefits likely to result from such a continental highway have been comprehended by one company, at least, and measures have been in active progress during the past two years to carry them out upon a scale which excites universal admiration. The object in view is the completion of a grand trunk line of the six-foot gage, extending from the Hudson river to the Mississippi river, opposite St. Louis; and from thence it was hoped the same broad track would at some future day be carried to San Francisco. The Atlantic and Great Western Railroad, now under the course of construction, is a continuation of the New York and Erie. It forms a junction with it at Salamanca, 416 miles west of New York, then proceeds through Jamestown, N. Y., into Pennsylvania, passing through Meadville, thence into Ohio going through Ravenna, and Akron to Dayton, to connect with the St. Louis Railroad, forming a line 1,200 miles in length of a continuous six-foot gage. This railroad was commenced in 1860, and sixty miles of it was constructed in May 1861, when it was suspended for some months. It has since then been completed to Akron, and was lately opened to that place. Upon that occasion, Wm. Reynolds, Esq., President of the Pennsylvania division, stated that in the short period of seven months the means had been furnished and the work virtually completed on 205 miles of railway, on nearly all of which distance, on the first of June last, not a shovel-ful of earth had been turned. This was a rapidity of construction unprecedented in railway history, and was the more remarkable as no portion of the work was sub-contracted, but was carried forward under the personal superintendence of the Engineer-in-Chief, T. W. Kennard, Esq. The magnitude of the work can be appreciated when it is remembered that it required nearly one mile of railroad to be constructed daily. About a year ago, we gave a description of some locomotives that were being built for this road at Paterson, N. J. Now there are 30 first-class engines and 340 cars running on it; and 30 new locomotives and 700 cars for it are in the course of construction. Every foot of such a railway adds to the solid wealth of our country, and in these dark days of war and trouble, the construction of such a railroad excites our wonder and commands our admiration. In expressing such an opinion we wish it to be distinctly understood that we are not the advocates of any special gage. We regret to state, however, that President Lincoln, in conformity with the power conferred upon him by the Act of Congress, has decided that five feet shall be the gage of the Pacific Railroad. This will break up the uniformity of gage for a great national highway, upon which the silks and the teas of the Orient could be carried from the Pacific to the Atlantic without a change of cars. The advantages of a uniform gage to form a grand continental highway, it seems to us, should be palpable to every one. It affords us pleasure to notice that our cotemporary, *The Railroad Record*, entertains similar views. This is not a question that should be controlled by minikin local interest and dwarfish views. It is a national question of vast importance, and should be decided upon national principles. We trust the President will reconsider this subject; for, upon mature reflection, we think he must decide for a uniform gage on the Pacific Railroad, which, when completed, will, in connection with the Atlantic and Great Western line, form the most magnificent railroad on this globe.

IS YOUR BOILER SAFE?

Every manufacturer, and every corporated body employing steam as a motive power, is immediately and directly interested in this question. In cities, particularly in the business part, the use of steam power is very general, and almost every square rod has its separate boiler. In view of this fact it behooves the merchants, capitalists, mechanics and engineers owning or in charge of these boilers to see that they are always in as good order as they can be put. Experience has demonstrated the fact that very many boilers are not only out of repair but totally unfit to be used at the pressure at which they are commonly worked; and not only is this a fact, but it is also true that these boilers have become so by carelessness and neglect. Without going further into this part of the question, let us see what can be done to avert the evil. Boiler explosions are continually occurring, and, so far from being solved as to the cause of them, remain as inscrutable as ever. While we cannot say, in every case, what the origin of disaster has been, we may at least avert the possibility of danger by paying some attention to the primary principles of boiler preservation. In the first instance, steam boilers are too often neglected. Many engine-drivers know little as to how the boilers are constructed or internally arranged, and being ignorant, of course they are incapable of giving the boilers proper attention. If manufacturers will continue to employ such persons, when there is plenty of skilled labor in the market, they and the public must abide by the consequences. We cannot do better in this article than to advert briefly to some of the causes which operate disastrously in steam boilers.

Steam is generated from water; it is pumped in for that purpose. Too much water wastes coal, too little burns the boiler; the golden mean should be observed in all cases. The hight of water in the boiler, measured by the gage-cocks, depends upon their distance from the crown sheet. In general the boiler-makers insert the first one at from four to six inches over the crown sheet of the furnace, the second one six inches above the first, and the third one at a like distance; thus water issuing from the third gage-cock indicates that there is eighteen inches of water on the crown sheet. This amount is never, or at least should not be, carried in the boiler, as it is useless and wasteful, provided the tubes or flues are in the proper place. Keep the water, as a general rule, between the first and second gages, or as engineers call it "scant two," and the best results will be obtained. On trying the water do not pull the handle of the cock round with a jerk; that may indicate a contempt of the force of steam, and be very knowing, but it is very bad practice. Open the cock gently and partially, so that only a slight aperture will be presented for the rush of the steam and water, and the actual amount of water in the boiler will be indicated. Steam naturally seeks an outlet; when the gage cock is opened suddenly the steam raises the water to the opening, and does not, therefore, give a true exhibit of the water line.

There are, however, other things equally as important as the quantity of water in the management of steam boilers, and these we will consider. Let us examine the braces and their relation to the work required of them. Take off the manhole plate, and get in the boiler. It is a good plan to do this once in a lifetime at least, as we can then fix the general appearance in our minds. Take a flat chisel or a small iron bar and sound the braces; possibly some will ring like a bell, while others vibrate slowly, like a loosened cord; take out the latter and shorten them, they are too slack. See to the jaws of all the braces that they be not split or cracked; take out all those braces which are worn thin by rust or the action of scale or deposit; in a word, set them up to their work. In some boilers there are not braces enough. The crown sheet, particularly, is weak when it is flat, and requires the most consideration. Ascertain the pressure of steam on your boiler, divide the area of the crown sheet into inches, multiply the inches by the pressure, and you have the weight in pounds which the furnace top has to sustain. Reduce the pounds to tuns and you will have some adequate conception of the crushing force on a fire-box roof.

Look also if there be scale forming on the flues or

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crown sheet; if there is, it must be removed. Salt water deposits scale very fast (we have some in our possession over two inches thick, being a part of the lining formed in the boiler of the steamship *Cahawba* some four or five years since), fresh water not so quickly; in all hard water, however, there is more or less lime, which acts injuriously by forming a base to which the other salts and minerals, held in suspension by the water, adhere. Some engineers remove the scale by a pick hammer made for the purpose; they are not very efficient and are dangerous tools in the hands of inexperienced persons. Another plan to remove scale is to produce a sudden heat by a train of shavings or turpentine in the flues and fire-box when the boiler is cold; the expansion of the metal cracks the parasitic coating, and is supposed to remove it in sheets of greater or less size. This method works tolerably well, but cannot be relied on in all cases; it is also dangerous as being liable to burn the boiler. The best way to remove scale without harm to the boiler is to take either slippery elm, flaxseed, or any other mucilaginous seed or bark and throw it into the boiler; by some peculiar action, which we are unable to solve, the scale is loosened and comes away in large pieces, and may then be removed through the hand-holes. We have tried the slippery elm with success in many cases, and it has never failed us.

If the stay and socket bolts of the water-spaces leak, they must be taken out and replaced; they are beyond remedy. The flues, by which the heat is arrested in its passage and imparted to the water, should be as clean as possible, and ought to be swept every week; dust and cinders accumulated in them check their conducting power, and the temperature in the smoke-box will be much higher than it ought to be if they are neglected. So also with the deposits in the fire-box from the grate. Many ignorant engineers permit a stratum of ashes to lay around the edges of their grate bars and the water bottoms, supposing that leakage is prevented thereby. We desire to inform such slovenly persons that the leaks have been caused in the first place by this very practice; doubtless they apply the poultice on the principle that "like cures like;" at all events it is a nuisance that should be stopped. So also with the water bottoms and legs of the boiler, keep ashes and water away from them and they will last longer. If leaks occur, stop them in a legitimate way; send for a boiler-maker and have them caulked, though an engineer should be capable of doing such work himself. It has been asserted that horse dung, slippery elm, flock and other fibrous or flocculent matter would stop leakage in a steam boiler. This may be a convenient practice, but it is an empirical one; a leak in a boiler is evidence of weakness in that part, the object is not to cover it up, but to strengthen it, and this can only be done by caulking or by renewing the seam with another sheet.

Finally, in reviewing this subject, let us assert that although the origin of steam-boiler explosions cannot be positively stated, we know that certain causes produce certain effects, and that neglect and carelessness have no business any where in mechanical matters, much less ought they to be visible about steam generators. Boilers should be clean inside and out, and strong as well. It is of no use to put on dabs of putty to hide leaks, or to fill a boiler half full of horse manure for the same purpose. Make a radical cure, take out the bad part and replace it with a new one; if the cocks leak—the blow-off or gage—grind them in and make them tight. The blow-cock too often runs away with fuel that no one thinks of; it permits the heated water to dribble out, little by little, this water has to be supplied by other, less hot, thus incurring a needless expenditure. Stop it. Grind the plug in tight. Take care of the safety valve, and don't have it sticking fast, or corroding, or leaking, try it every day; load it properly and use it properly and it will do good service, but not otherwise. How many engineers are there in this city or in others that will conform to the above rules—reliable and standard ones, and proved by actual practice and experiment?

PENNIES.—People who pay a premium for pennies are perhaps not aware that the United States Mint at Philadelphia will exchange any quantity of cents at par for Government currency.

BREECH-LOADING versus MUZZLE-LOADING GUNS.

An interesting communication on the above subject, on another page, deserves general perusal. The differences in the general construction and use of muzzle-loading and breech-loading fire-arms are pointed out, but so far as it relates to their comparative efficiency, all the questions involved have not been presented. At short range the old smooth-bore American musket, with a cartridge containing one ball and two buckshot, was more destructive of life, in battle, than the rifled musket. For general service, however, the latter is esteemed the best, because it is more accurate at longer ranges. Our correspondent asserts that the accuracy of a gun depends mainly on the weight of the barrel and the finish of the bore; and as a breech-loader can be furnished with a barrel like that of a muzzle-loader, he concludes it must be far more efficient, as it can be loaded and discharged fifteen times faster.

It is indeed self-evident that if a breech-loading rifle can discharge all its bullets as accurately as a muzzle-loader and fifteen times more rapidly, it must be fifteen times as efficient. But here lies the doubtful point. The weight of the barrel and the finish of the bore are not the only elements of accuracy in a rifle. We have heard first-class marksmen, who had tried all kinds of breech-loading and muzzle-loading rifles, assert that the former were not reliable—they could never trust them in shooting a string of shots. Three reasons have been given for the superior accuracy of muzzle-loaders. First, a rifle will not shoot accurately unless its bore is kept clean. When loading at the muzzle, the cartridge or the patch carries down the residue of the former charge, cleaning the barrel and giving the bullet a more free passage out. In a breech-loader the bullet carries the residue or dirt before it, thus impairing its free and equal egress. Second, the bullet must be perfectly centered and fitted in the bore when it is loaded or it will not carry straight when discharged. It can be perfectly centered and swedged, if required, at the muzzle and rammed down accurately, so that its flight may be trusted. In the breech-loader this cannot be so perfectly accomplished. An exception to this may be claimed for the chambered breech-loading rifles. Third, muzzle-loaders are not liable to leak at the breech; but in breech-loaders the flash of the charge in the face of a marksman renders his aim unsteady—he becomes liable to shut his right eye and dodge when he draws the trigger. We have seen this exemplified in the use of the earlier Sharp's rifles. Copper cartridge cases obviate leaks at the breech, but they are too expensive for use in the army, and a good fire-arm should be capable of use both with and without a cartridge. Unless a rifle can be trusted for accuracy, the rapidity with which it can be loaded and fired is of but secondary importance. Breech-loading rifles are more complex in their construction than those which load at the muzzle; still soldiers may keep them in good condition with very little more care. If the conditions of accuracy belonging to muzzle-loaders and a perfectly close fit in the breech were supplied to them, they would be far more efficient and desirable. We have understood from verbal reports that the large number of breech-loading rifles furnished to the sharp-shooters in our army have not given satisfaction. Reliable information on this subject would be instructive, because rifles, like machines, can only have their relative merits fairly tested by actual service for a considerable period of time—not by a few trial shots.

SORGHUM CANE AND SUGAR.

Sugar has become one of the necessaries of common life in all countries. Hitherto its chief supplies have been obtained from cane cultivated in hot latitudes. The possibility of deriving sufficient quantities from a species of cane cultivated in mild latitudes, such as in our Northern and Western States, forms a subject of deep and general interest. The farmers in our fertile Western and North-western States have lately devoted much attention to this question, and from information with which we have been furnished, we believe it is proceeding toward a satisfactory conclusion.

Conventions of the cultivators of the sorghum cane and manufacturers of apparatus, sirup and sugar, have been held in various States, and the proceedings of these have been briefly noticed in our columns. At such a convention, held at Columbus, Ohio, it was asserted that the sugar of the Chinese and imphee canes was grape, not cane, sugar. This is an important feature of the case, because the latter sugar possesses more than double the sweetening power of the former. In order to solve the problem samples were sent to Mr. C. W. Wetherell, Chemist of the Department of Agriculture, in Washington. In his report on the subject, dated January 13, 1863, he says that he has examined two samples of the sugar (one from C. Cory, of Lima, Ind., and the other from J. H. Steel, of Ohio) by the microscope and with polarized light, and compared them with New Orleans sugar, and he has no hesitation in pronouncing them cane sugar.

A convention of sugar-growers was held at Adrian, Mich., on the 23d of January last, at which Mr. C. Cory presented the following report, which contains much practical and interesting information:—

Of the several samples of sugar noticed in your premium lists, two lots representing some fifty pounds of the same grade, were made purely of the common Chinese cane, the four other lots were manufactured from the new variety known as the "Otaheiten" or "Sugar Cane," and represents upwards of seventy pounds, produced from a half load, i. e., 1,264 lbs. of cane. The crop was grown on a rich prairie soil of sandy mould. It was planted about the 10th of May, and was much retarded by deep covering and by long, heavy rains, but grew rapidly during the middle and later part of the season. Lime, ashes and plaster were used in the hill during its early growth. About the first week in October the leaves were stripped and the cane carefully sheltered. On the 8th of the following month the tops of the stalks were taken off, and from five to six feet of the butts passed carefully through the mill, giving 57 per cent. juice and 43 per cent. bagasse. To the juice a small quantity of liquid lime was added to neutralize in part its acidity, and to aid in its defecation. It was then divested of its scum and other impurities, and concentrated to its requisite consistency, by being passed in a thin, transverse current over the intensely heated surface of our clarifying and evaporating pan. After which it was strained through a linen cloth, while hot, into shallow boxes, and deposited in a warm room with a view to its granulation. As an unusual thing in the case of our Northern canes, it commenced granulating during the process of evaporation, and within about twelve hours after its removal to a warm room, formed almost a solid mass of crystallized sugar. That this is veritable cane sugar, and not sugar, as sometimes hinted, of a bogus kind called grape sugar, we have the enlightening testimony of numerous witnesses, including dealers, refiners and chemists of noted ability.

Mr. Cory has sent us two samples of sugars derived from Chinese and Otaheite canes cultivated in the West. He says:—"The profitable making of sugar from these, especially the Otaheitan variety, recently introduced, will, I fully believe, soon be most clearly demonstrated." We have also received a communication on this subject from J. M. Moss, of Waverly, Iowa, which we will publish in our next issue. It is our intention to present all the practical information we obtain on the cultivation of the sorghum canes and the processes and apparatus for making the sirup and sugar, so as to furnish all who are interested with reliable knowledge on the subject.

Chinese Grass—Flax-cotton Cloth.

We have lately examined samples of a very beautiful fabric made of wool and cottonized Chinese grass, by L. W. Wright, No. 140 Devonshire street, Boston. The grass is bleached and reduced to what is called "the cotton state," at a cost of only three cents per pound. Mixed with a certain proportion of wool it makes cloth of excellent quality. The fiber is long and strong, and the cloth soft and fine. We believe that this new fiber is superior to common cotton in its application to such purposes. It can be dyed by the same processes as cotton and common flax. We are always gratified to chronicle the introduction and success of any new manufacture. We have been informed, also, that quite a number of factories in New England have lately engaged with success in the manufacture of coarse flax fabrics, such as burlaps, &c., which were formerly imported from Europe.

NEW ZEALAND.—The European population of New Zealand is stated by the Registrar-general at between 101,000 and 102,000 at the close of the year 1861, but it was impossible to ascertain with absolute accuracy the number of the gold-diggers. The increase of population in three years had been nearly 72 per cent.

FINE specimens of coal have been found in Indiana, and the inhabitants of that State are confident the deposit will prove to be a rich one.

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AMERICAN INVENTIONS ABROAD.

Foreign nations have not been slow to acknowledge the superiority of Americans in the arts and in inventing appliances by which the severity of labor is lessened, and the product of it cheapened. It is only necessary to mention the several machines with which the public are immediately familiar to prove this assertion ; as, for instance, the sewing machine, the reaper, the milking machine, and numberless other devices of the kind introduced into foreign countries, in connection with which we have been happy to serve our patrons. We have before us the printed specifications of several American inventions which have been patented in England, through the Scientific American Patent Agency, and which have been favorably received there :—

METHOD OF JOINING WOODEN BOXES.

Patentee : Wright Duryea, of New York City.—This patent covers a new method of making wooden boxes, whereby the several sections comprising the same are united by thin metallic strips, bent into any desired form, and inserted endwise into slots cut in the beveled ends of the stuff, so that they bind the whole fabric firmly together. A very ingenious device.

RAILWAY JOINTS OR CHAIRS.

Patentees : Raymond French, of Seymour, Conn., and William Goddard, of Boston, Mass.—This arrangement consists in making lines of rail continuous and holding them together firmly, by shrinking the chair that the ends of the rail are received in, on to the rails themselves. By this method an exceedingly reliable and firm hold is obtained.

PUMPS.

Patentee : Thomas Hansbrow, of Sacramento City, Cal.—This invention relates to the employment of inclined valve seats which do not permit the lodgement of any foreign substance on their surfaces, whereby their action would be impaired ; also to the general arrangement of valves and bonnets of the same, with a view to convenience and ease of access to them.

ARMOR PLATES FOR IRON-CLADS.

Patentee : Edward Cox, of Point Pleasant, Ohio.—The inventor has, in this instance, contrived a method whereby the several plates on the ship's side are combined together by a series of joints or tongues that lap over each other, thus strengthening the vessel. Two of these grooves and tongues are on one face of the armor plate and two on the opposite face, to allow of the interlocking of the edges of adjacent plates ; these are similarly formed and arranged in rows, so as to break joint with adjacent rows.

APPARATUS FOR RAISING OR FORCING WATER.

Patentee : Abel Brear, of Saugatuck, Conn.—This is a device for the above purpose, and consists of a series of pipes, arranged peculiarly with reference to one another. The water is raised by creating a vacuum in these pipes by the agency of steam or compressed air.

BITS FOR BREAKING COLTS AND HORSES.

Patentee : A. L. Weymouth, of Boston, Mass.—The object of this invention is to produce a bit by which perfect control can be had over vicious beasts ; to this end the bit is constructed with a central joint, that, by expanding with pressure, opens the mouth of the animal at the will of the driver, and effectually checks any unruly feeling he may have. The bit can be used either in connection with the ordinary one or separately, as desired, and must prove a very desirable appendage to a harness.

SETTING ARTIFICIAL TEETH.

Patentee : David Steinberg, San Francisco, Cal.—In this plan the false teeth are set in a gold, platinum, or other metallic plate, by means of vulcanized rubber, whereby all soldering or riveting, by which the plate is liable to be warped, is dispensed with. The plate is prevented from oxidizing, and is also strengthened by the gum.

MANUFACTURE OF WROUGHT-IRON ORDNANCE.

Patentee : David T. Yeakel, of Lafayette, Ind.—This patent relates to a method of forming guns out of a continuous sheet of metal, by wrapping the same about a mandrel ; it was illustrated and described on page 325, Vol. VI (new series), of the SCIENTIFIC AMERICAN.

FERTILIZING COMPOSITION.

Patentee : J. M. Gallacher, of Roxbury, Mass.—This invention consists in the compounding of certain chemical agents together, whereby the productive properties of any soil which has been exhausted by injudicious farming can be invigorated.

CHIMNEYS FOR LAMPS.

Patentee : Harvey Brown, of New York City.—This improvement consists in forming the chimneys so that they will be suitable for any kind of lamp, or for any sort of oil or liquid that requires a chimney to promote combustion. They are a combination of glass and metal, and appear to be exceedingly efficient and ornamental.

SEPARATING VEGETABLE FIBERS AND EXTRACTING THE COLORING MATTERS THEREFROM.

Patentee : A. S. Lyman, of New York City.—This invention relates to the separation of the fibers of vegetable substances by whipping, beating or grinding them while exposed to the action of water, at such temperatures and at such pressures as may be advisable ; and further relates to the washing out of the coloring matter, gum, &c., by changing the water while they are undergoing the processes above mentioned.

This long list is only a tithe of those inventions which are continually passing through our hands, the claims of which we have successfully prosecuted abroad for American inventors and proprietors of patents. Nothing is more gratifying to the patriotism every lover of his country possesses, than the position which we are rapidly securing to ourselves abroad, of being the first nation on the globe in the variety and utility of our labor-saving machinery.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list.

Clothes-drying Machine.—The object of this invention is to obtain a simple and economical device to facilitate the hanging out of clothes for drying, and also to facilitate the taking of them down from the line when dried. At present, as is well known, clothes are taken from a basket and secured to the line, one piece at a time, with pins. They are also, when dried, removed from the line, one piece at a time. This is a slow and tedious operation in cold weather, and is attended with considerable trouble in windy weather—difficulties which, it is believed, are fully obviated by this invention. The invention consists in the employment of hangers or supplemental frames arranged in such a manner that the clothes may be applied to them in the house or under cover, where the washing is performed ; the hangers or frames, with the clothes attached, being placed or suspended on suitable drying lines prepared to receive them. Charles Goldthwait, of South Weymouth, Mass., is the inventor of this device.

Defensive Armor for Vessels.—This invention consists, principally, in the construction of defensive armor for ships and other vessels, of two series of plates, arranged parallel with the sides of the vessel with a space between them, and arranging within the said space, plates, tubes, scrolls or strips of metal set edgewise, so as to present themselves to the crushing force of projectiles, in such a manner as to form the equivalent of hollow columns in resisting such force, such armor making a cellular structure very strong in proportion to its weight, and when continued below the water-line, giving the vessel an additional degree of buoyancy to compensate wholly or in part for its own additional weight. It also consists in a certain mode of constructing the contiguous parts and joints of the outer plates, whereby the said plates are made to form boxes for the reception of the plates, strips, tubes or scrolls which form the inner cells or columns, and to protect the bolts which attach the armor to the vessel. R. H. Jewett, of Mount Sterling, Ill., is the inventor of this improvement.

Revolving Fire-arm.—This invention consists, first, in the employment, in combination with a cylinder frame opening by a movement on a hinge joint arranged in front and below the line of the axis of the cylinder, and with an axis pin secured to the barrel, of a spring latch so constructed and applied as to serve the two purposes of connecting and locking the barrel with the upper part of the frame, and of securing the cylinder upon the axis pin when the barrel is disconnected from the upper part of the frame. It consists, secondly, in so constructing the spring latch and the hammer, that when the hammer is down it aids in securing the spring latch in its connection with the frame, and so aids in securely locking the barrel to the upper part of the frame.

It consists, thirdly, in so constructing the axis pin and applying the same in combination with the barrel or frame of the arm that, while remaining attached to the barrel or frame, it may be employed to expel from the chambers of the cylinder the cartridge cases, shells or other matter which may remain therein after firing the arm. And, finally, it consists in a certain mode of applying a detachable recoil plate in combination with the spring which keeps the revolving dog to its work, whereby the said plate, while allowing the dog to work through it, is made to aid the said spring in excluding from the lock any gases escaping at the rear of the cylinder in firing. J. C. Howe, of Worcester, Mass., is the inventor of this fire-arm.

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING FEBRUARY 17, 1863.

Reported Officially for the Scientific American.

*** Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

37,668.—Railroad Chair.—John Armitage, Troy, N. Y.:

I claim the combination of the fixed and hinged jaws, B E, and screw bolts, I I, with a base-plate, A, arranged substantially as and for the purpose set forth.

[This invention consists in constructing the chair with an adjustable or hinged jaw so arranged as to admit of a rail being removed from the chair and also fitted or secured in it without detaching the chair from the sleeper, thereby effecting a saving in labor and expense, and also avoiding the injury hitherto done to the sleepers in consequence of the repeated driving-in and withdrawing of spikes from the latter.]

37,669.—Galvanizing Wire.—George Bedson, Manchester, England:

I claim drawing the material in a heated state from the annealing oven directly into the cleaning bath, and thence, when galvanizing is to be done, directly into the bath of molten metal substantially as herein shown and described.

37,670.—Molding and Casting Pipe.—Benjamin S. Benson, Baltimore, Md.:

I claim, first, The annular flanged base-plate, D d, employed in the described combination with the annular plate, C, and constituting a seat to guide and hold the lower end of the core, as explained.

Second, The detachable anchor, F f, constructed and applied substantially as described to prevent the deflection of the intermediate portion of the core.

Third, The shield, G, employed in the manner explained, to exclude sand, metallic oxide, or other foreign matter, and permit the entrance of the molten metal.

[This invention effectually prevents the deflection or displacement of the core, which, with molds in common use, is the chief cause of producing pipe of unequal thickness in different parts. A simple and ingenious device is also employed to prevent the entrance of sand, metallic oxide, or other foreign matter within the mold in the act of pouring, and all danger of flaws in the pipe is thus avoided.]

37,671.—Sash-fastener.—Samuel W. Bidwell, Hartford, Conn.:

I claim the double-pronged, swinging catch-piece, e, in combination with the perforated suspension plate, a ; the whole constructed substantially in the manner hereinbefore described, and operating to lock both sashes of a window, as set forth.

37,672.—Horse Rake.—S. C. Brinser, Middleton, Pa.:

I claim the combination of the treadle, K, levers, J H, and connecting rod, I, constructed and arranged as specified, with a horse rake in which the draft is applied to the thills or bed and the latter hinged to the rear and upper part of the axle; all as herein shown and described and for the purposes set forth.

[By this invention the action of the rake is rendered as nearly automatic as possible, the forward draught of the team being used to elevate and clear the teeth at the proper instant, and the weight of the driver serving to hold them down at other times. A slight motion of a lever serves to bring either of these opposing forces into controlling action so that the operator is entirely relieved of the labor of working the rake.]

37,673.—Boiler-feeder.—Theodore W. Burger, Jersey City, N. J.:

I claim the arrangement of the chambers, d c e, valve, B, and ports, h i, substantially as and for the purpose herein specified.

[This invention relates to that class of boiler feeders through which the water is fed into the boiler by gravitation through an opening, the height of which regulates the level to which it is supplied; and it consists in a certain arrangement of the chambers, valve and posts whereby the construction of such feeders is much simplified.]

37,674.—Machine for Shelling and Winnowing Corn.—Benjamin Clough, Natick, Mass.:

I claim my improved arrangement of the two grids, D E, and the

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cob and kernel eduction passages, F I, with the chute, H, the elastic concave, C, the stripper, B, and fan blower, K, the whole being arranged as shown in the drawings and as above described.

37,675.—Percussion Fuse for Explosive Shells.—John Webster Cochran, New York City:

I claim, first, The hollow tapering and contractable material, G, arranged to operate in connection with the striker of a percussion shell substantially in the manner and so as to secure the advantages herein set forth.

Second, The loaded cap or mass, G, arranged to operate in connection with the striker, D, and tapering contractable material, F, in the manner set forth.

37,676.—Cow-milker.—L. O. Colvin, Philadelphia, Pa.:

I claim, first, The pan or receptacle, A, provided with the arm, F, having the straps, G H, attached to it, in combination with the india-rubber or other suitable flexible cover or piston, C, lever, E, and teat tubes, I, all arranged to operate substantially as and for the purpose herein set forth.

Second, Providing the teat tubes, I, each with a spiral wire, I′, as and for the purpose herein specified.

Third, The attaching of the teat tubes, I, to the horizontal tubes, H′, of the pan or receptacle, A, by means of hooks, i i, attached to rings, J, on the lower ends of the teat tubes and which hooks are fitted over the edges of plate, g, secured to the part, f, of the tubes, H′, as herein set forth.

[The object of this invention is to obtain a cow-milking device of simple construction and which will be more under the control of the operator than those previously constructed, capable of being used or operated with greater facility, more readily cleansed, and which will have a more natural sucking or drawing action upon the teats of the cow, closely resembling that given by a calf in sucking. See illustration of this invention on page 49, current volume of the Scientific American.]

37,677.—Breast Pump.—L. O. Colvin, Philadelphia, Pa.:

I claim the cup, A, provided with the valve, B, in its bottom; in combination with the piston, I, constructed of india-rubber or other flexible material, nipple tube, E, and milk receptacle, C, with the handle, F, and lever, G, or their equivalents, all arranged substantially as and for the purpose specified.

[This invention consists in attaching a milk receptacle of glass or other suitable material to a pump constructed and operated in a novel way and provided with a nipple tube of peculiar construction, all being arranged in such a manner that the device will be under the complete control of the operators, and the suction or draw regulated with the greatest nicety to suit the convenience of the latter. See illustration of this invention on page 49, current volume of the Scientific American.]

37,678.—Clasp for Harness Tugs.—L. D. Cowles, Armada, Mich.:

I claim the two plates, A F, in combination with the lever plates, E E, provided with the eccentrics, c c, and connected to the plate, F, through the medium of the screws, C, and rods, D, all arranged substantially as and for the purpose herein set forth.

[This invention is designed to supersede the ordinary tug buckle by avoiding the holes which are necessarily required to be made to receive the tongue of the buckle, and also by affording a more ready means for lengthening and shortening the tug.]

37,679.—Railroad Track-clearer.—Ruel Dean, Boston, Mass.:

I claim the suspended plow, A, with its scrapers, d, in combination with the spring, H, and lever, F, or its equivalent, constructed and operating in the manner substantially as set forth.

37,680.—Valve for Hose Nozzles.—John M. de Bolle, Philadelphia, Pa.:

I claim the application to hose pipes of the valve disk, A, the same consisting of the conical or beveled edge, C, the flange, F, and the thin gum elastic ring, E, constructed and arranged in relation to each other as set forth, and operated together by means of the carrier, G, on the lever, D, as and for the purpose specified.

37,681.—Self-locking Safety Hook for Tow Lines.—Daniel de Garmo, Rochester, N. Y.:

I claim the combination of the spring bolt, D, with the lever, C, and the swing hook, B, substantially as and for the purpose specified.

37,682.—Forming Bell-crown Hats.—William E. Doubleday, Brooklyn, N. Y.:

I claim the method herein specified of forming bell crowned hats, bloomers, &c., by an elastic band applied around the crown to draw the same to the die or block, after the general shape has been given to the hat or bloomer between dies as specified.

[An illustration of this invention appeared on page 384, Vol. XII. (old series) Scientific American.]

37,683.—Chimney Top.—George Elbreg, Cincinnati, Ohio:

I claim the combination of the self-acting doors, A′, with the openings, b, and plates, a, in the manner and for the purpose herein shown and described.

[The object of this invention is to obtain a chimney top by which a back draught or downward current of air in the chimney will be prevented, and water or rain also prevented from passing down into the chimney. The invention consists in providing the chimney top with a series of inwardly projecting plates and lateral openings around in such a manner as to effect the desired end.]

37,684.—Sliding Hinge.—James M. Eveleth & George C. Moore, Oroville, Cal.:

We claim a sliding hinge the use and purpose of which is to overcome the disadvantage arising from the shrinking and swelling of gates and doors, as herein described.

37,685.—Preparing Night Soil for Manure.—R. B. Fitts, Philadelphia, Pa.:

I claim the improved method or process described, for producing desiccated night soil for agricultural purposes.

37,686.—Clothes-drying Apparatus.—Charles Goldthwait, South Weymouth, Mass.:

I claim the employment or use of the hangers or supplemental clothes-frames, C, provided with hooks, d, and constructed in such a manner that the clothes may be secured upon them, and the hangers or frames suspended on the line, A, as herein set forth.

37,687.—Straw-cutter.—Alexander Gordon, Rochester, N. Y.:

I claim, first, The employment in cutting boxes, of the feeder belt, B, when constructed, arranged, and operating in the manner specified.

Second, The yoke, F, and straps, g, as specified, for the purpose of keeping the pinions, p and p′, in the same relative position as the latter moves up or down.

37,688.—Amalgamatory Machine.—Elander Heath, San Francisco, Cal.:

I claim the employment of a cylinder, constructed internally with corrugations and ribs arranged and described, and rotating upon its diagonal axis.

37,689.—Shears.—R. Heinisch, Newark, N. J.:

I claim, first, The shears, the upper blade of which is formed out of line with the shank as described, being so bent that the cutting edge shall fall nearly or quite in line with the rivet or clamp screw and cross the shank in a diagonal line in its direction; and so that when the shears are closed the back of the upper blade shall present a hip like elevation coincident with such recession of the blade all as shown and described.

Second, In combination therewith, the extension wedges as shown and described.

37,690.—Lamp.—Albert N. Henderson, Buffalo, N. Y.:

I claim the combination of the said larger tube around the said wick tube so as to afford the said space, without air holes, between them in connection with the said small holes connecting said space with the interior of the body of the lamp, in the manner and for the purposes set forth.

37,691.—Potato-digger.—Samuel Sherman Hickok, Marlboro, N. J.:

I claim, first, The vibrating prongs, 11, fitted as specified in combination with the mold boards, h, and nose, i, for the purposes and as set forth.

Second, I claim the bar, k, curved forward and downward as shown and extending in front of the mold-boards to ensure the raising of the weeds and vines sufficiently to prevent their clogging as set forth.

Third, I claim the arrangement of the compound levers, o and r, and links, m and q, in combination with the wheel, e, and cams, t t, for giving motion to the vibrating prongs as set forth.

37,692.—Drop Press.—Bennet Hotchkiss, New Haven, Conn.:

I claim, first, The eccentric pulley, F, in combination with the pulley, E, when the same operate in the manner and for the purpose substantially as herein set forth.

Second, The eccentric pulley, F, and drop, A, when the same are combined substantially for the purpose as herein specified.

Third, The lever, L, and latch, f, when the same are combined in the manner described with the eccentric pulley, F, for the purpose specified.

Fourth, The combination of the lever, L, and latch, f, with a drop substantially as herein described.

Fifth, The rod, M, with its adjustable stops, h and i, in combination with the lever, L, and latch, f, substantially in the manner and for the purpose herein set forth.

Sixth, The adjustable trip in combination with a drop substantially as and for the purpose specified.

37,693.—Revolving Fire-arm.—John C. Howe, Worcester, Mass.:

I claim, first, The spring latch, E, constructed and applied to serve the two purposes of connecting and locking the barrel to the upper part of the frame and of securing the cylinder on the axis pin when the barrel is disconnected from the upper part of the frame, substantially as herein described.

Second, So constructing the rear end of the spring latch and the head or nose of the hammer that when the hammer is down it aids in securing the spring latch in connection with the frame substantially as herein specified.

Third, So constructing an axis pin and applying the same in combination with the barrel or frame that while remaining attached to the barrel or frame, it may be used to expel from the chambers of the cylinder the cartridge cases or shells or any other matter which may remain therein after firing, substantially as herein described.

Fourth, Though I do not claim a movable recoil plate, I claim the combination of the detachable recoil plate, D, and the spring, t, inserted in the front of the frame and secured by a screw, t′, covered by the said recoil plate, substantially as and for the purpose herein described.

37,694.—Bench Plane.—Seth C. Howes, South Chatham, Mass.:

I claim the rod, F, having the screw, d, cut upon it, and provided with the nut, E, with spurs, b, on its outer surface to fit in holes in the plane-iron, C, in combination with the cap, D, provided with the screw, K, and trunnions, e e, the latter being fitted in adjustable bearings, f f, which are placed in slotted plates, J J, and retained therein at the desired point by the serrated edges of the bearings, and the slots or any equivalent means; all arranged substantially as set forth.

[This invention relates to an improvement in that class of planes which are commonly termed "bench planes," comprising the fore plane, smoothing plane, jack plane, jointer, &c. The invention consists in a novel and improved mode of adjusting the plane iron to regulate the depth of the cut of the same, in connection with an adjustable cap, all being constructed and arranged in such a manner that the plane iron may be set with the greatest facility and firmly retained in position by the adjustment simply of the cap to the plane iron after the latter is "set," and the cap also rendered capable of being adjusted to compensate for the wear of the "sole" or face of the plane stock.]

37,695.—Defensive Armor for Ships and other Batteries.—R. H. Jewett, Mount Sterling, Ill.:

I claim having the filling plates, C, made in corrugated form, united at the angles, a, and placed endwise and clamped between the plates, A B, as herein shown and described, so that independent air-chambers, h, will be formed by said plates, while the plates, C, will resist all exterior pressure on their ends, like pillars, thus securing great strength and buoyancy, all as set forth.

37,696.—Composition for Porous Stone for Filtering and other purposes.—F. C. Krause, New York City:

I claim the employment or use of a composition for porous stone made of the ingredients herein specified, and mixed together in about the proportion and substantially in the manner described.

[The principal object of this invention is to produce a porous substance which can be used for filtering water and nearly all the known acids or bases, without being injured or dissolved by the operation.]

37,697.—Nitrated Mercurial Ointment.—Caroline Learned, Columbus, Ohio:

I claim the herein-described vermin ointment, composed of the ingredients named, and compounded in the manner specified.

37,698.—Water Wheel.—Jacob Luther, Walnut Fork, Iowa:

I claim the buckets, G, constructed as described, so as to have at the face sides three different surfaces, h i j, and attached to the verge or periphery of the head or body, e, of the wheel; in combination with the case, C, formed of two parts, a a, arranged or disposed relatively with the wheel, as shown, so as to form two water induction passages, bb, and two curved taper waterpassages, c c, substantially as and for the purpose herein set forth.

[This invention relates to a new and useful improvement in horizontal water wheels of that class in which power is designed to be obtained, both from the direct and re-acting force of the water in its passage through the wheel. To this end, the invention consists in the employment or use of a series of buckets attached to the verge of the wheel, and formed in such a manner that power is obtained from the direct action of the water against the buckets, and also by its re-acting force as it escapes through the issues.]

37,699.—Clothes-wringing Machine.—David Lyman, Middlefield, Conn.:

I claim the within-described arrangement of the tapering and freely rocking springs, M N, relatively to the bearing boxes, C C, and screws, D D, or their equivalents, for the purpose herein set forth.

37,700.—Lock.—John T. Mygatt, Binghamton, N. Y.:

I claim the collar, H, placed loosely on the arbor, E, and provided with an oblique end, d, in combination with the oblique end, c, of the shank, b, of the knob, F, pin or catch, e, the spring, J, and cap, I, all arranged with the arbor, E, to operate as and for the purpose set forth.

[This invention relates to an improvement in locks and latches which are provided with a sliding latch bolt operated by the turning of a knob. It consists in constructing and arranging the knob and knob-arbor in such a manner that the projections on the hub which is fitted on the arbor may be thrown in and out of line with the slide against which the latch bolt bears, and the latter, when desired, be rendered entirely free from the projections on the hub, so that they cannot act upon the latch bolt when the knob is turned, and the former thereby be made to answer the purpose of a bolt. The object of the invention is to render, when necessary or desired, the ordinary lock or knob latch inoperative from the outer side of a door, and render useless the appliance of bolts or fastenings of any kind at the inner side. It does not disfigure the door, like bolts and catches, as it works on and is concealed by the knob, and, from its very nature, is much more convenient than either.]

37,701.—Lateral Waste Valve for Pumps.—Amos Nudd, Waupun, Wis.:

I claim the combination and arrangement of the rod, sliding-gate and socket with the stock of the pump, when operating in the manner and for the purposes substantially as set forth.

37,702.—Flyer of Spinning Machines.—Oliver Pearl, Lawrence, Mass.:

I claim the combination of the nose or upper bearing of the flyer, with the sides or arms made of flattened wire and brazed or attached to the nose, so as to be nearly in a tangent to the bobbin, and present the thin edge of the arm to the air when revolving.

37,703.—Heading Tool for Screws.—C. E. Phillips, Abington, Mass.:

I claim the arrangement of the adjustable and removable blade, D, in combination with the jaws, B C, constructed and operating substantially as herein described for the purpose specified.

[The object of this invention is to produce nails with polished slotted heads similar to screw heads, by means of a simple tool attached to the lever, or other corresponding part of a nail machine.]

37,704.—Elevator and Carrier.—Henry E. Plumb, Monroe, Conn.:

I claim, first, The combination of the carriage, C, ways, B B, counterpoise weights, F F, and rope, M, all arranged substantially as shown for the purpose specified.

Second, The hook, K, and the flap, J, in connection with the button or knob, N, on the rope, M, arranged substantially as shown, for liberating the carriage, C, at any desired elevation of the bucket, as set forth.

Third, The brake, G, when used in combination with the counterpoise weights, F F, drum, E, and carriage, C, as and for the purpose specified.

Fourth, The adjustable frame, O, when used in combination with the carriage, C, ways, B B, and bucket, L, or other receptacle or load holder, for the purpose of discharging the elevated load at the desired spot, as described.

[This invention relates to a new and improved machine for elevating articles to a desired height, and then conveying or carrying them to the spot where they are to be deposited. The machine is designed to be operated by horse-power and is intended for depositing hay in barns, loading and unloading vessels, and such like purposes.]

37,705.—Machinery for carving and drilling Gun-stocks.—J. G. Pusey, New York City:

I claim, first, Arranging a series of tool stocks to radiate from a common center, in combination with a series of tracers, substantially as specified, whereby all the tools and tracers may be moved together in mortising, boring or carving, but the tools not in use will, by their divergence, be out of the way, as set forth.

Second, I claim the arrangement of the pulley, m, in the middle of the circular head, k, and of the fork, p′, or its equivalent, for receiving and changing the belt, d′, in the manner set forth.

Third, I claim the parallel bars, e e e′ e′, fitted and arranged substantially as specified, in combination with the circular head, k, for the purposes and as specified.

Fourth, I claim the frame, u, on centers, 10, at right angles, or nearly so, to its length, and receiving the pattern and gun stock, or other article, substantially as specified, whereby the pattern and article to be acted upon can be reversed to present either side to the tool and tracer, as set forth.

Fifth, I claim a holder fitted on centers and carrying the pattern and gun stock, and arranged substantially as specified, to swing on said centers while the tool is inletting or cutting the curved parts of the stock, in order that the said tool may act at right angles to the surface, for the purposes and as specified.

37,706.—Annunciator.—Andrew Rankin, Philadelphia, Pa.:

I claim, firstly, The uses of a plate, D, or its equivalent, connected to the alarm bell of an annunciator, and so arranged in respect to the wires connected to the slides, B, that the movement of each wire, as it operates its slide, will impart such a movement to the plate, D, as will sound the bell.

Secondly, The slides, with their projections, b, when arranged in respect to the plate, A, substantially as set forth, for direct connection to the wires.

Thirdly, The frame, H, with its cross-pieces, f f, in combination with the projections, b, of the slides, B, the whole being arranged and operating substantially as and for the purpose set forth.

37,707.—Lifting Jack.—Williams F. Rundell, East Genoa, N. Y.:

I claim, first, Having the fulcrum pin, a, fitted loosely in a hole in the lever, c, and secured against casual longitudinal movement therein by means of a set screw, n, when arranged in the manner and for the purpose specified.

Second, The rigidly attached rack bar, e, standard, d, and toothed racks, g g, in combination with the loosely-fitted fulcrum pin, a, lever c, and feathered edge plate, m, when the whole is arranged to operate in the manner and for the purpose specified.

[This invention consists of a standard which is slotted at its upper part, and has attached to its front side two peculiarly-shaped toothed rack-bars, between which in the slot the lifting lever is placed, and supported by its fulcrum-pin resting on the teeth of said rack-bars. The long end of the lever is provided on one side with a feathered edge plate, which engages with the teeth of another rack-bar attached to the rear side of the standard, and thereby serves to hold the lever in any position in which it may be placed.]

37,708.—Machine for stringing Dried Apples and other Fruit.—Samuel T. Sandford, Fall River, Mass.:

I claim; first, A knife, D, constructed or bent in the form substantially as shown, in combination with a string, F, the latter being attached to the former, and both arranged to operate as and for the purpose set forth.

Second, In combination with the knife, D, and string, F, the revolving hopper, B, and box, A, all constructed and arranged for joint operation, as and for the purpose specified.

[This invention relates to a new and useful device for stringing fruit preparatory to drying the same, and consists in the employment or use of a knife constructed in a peculiar manner so as to admit of a string being attached to it, said parts being so arranged that the fruit may be fed to the knife in quarters, or in pieces of suitable dimensions, and forced down upon the knife and on the string—the knife serving as a needle to string the fruit. The invention furthur consists in the employment or use of a revolving hopper placed within a suitable box, and arranged in relation with the knife, whereby the fruit may be fed to the knife with the greatest facility.]

37,709.—Oil Still.—John D. Smedley, Chicago, Ill.:

I claim the use of the large pipe, A, in combination with a small horizontal connecting tube, B, in any way substantially as described, by means of which the fluid in the pipe being kept constantly cool and free from agitation from the still, the quantity of liquid in the still is always correctly indicated.

I also claim the extension of the pipe, A, below the bottom of the still, forming a chamber, a, by means of which the water is separated from the oil, and can be drawn off.

37,710.—Steering Apparatus.—Addison Smith, Perrysburgh, Ohio:

I claim the combination of a main pipe with branches, c c c c, branching at right angles with the keel, for the purpose only of turning a vessel on a center or moving it sidewise, as herein described.

37,711.—Apparatus for clasping Hoops to Ladies' Skirts.—D. M. Smyth, New York City:

I claim, first, The double inclination of the surface of the feeder, in combination with the side flanch and the three successive longitudinal slots for permitting the escape or discharge of such of the clasps as are not in the required position, and for holding back such as happen to be in the required position, with the stems upward, and for gradually turning them over that they may be delivered one by one with the stems downward, substantially as described.

Second, The carrier, with its up-and-down movements to liberate a hoop which has been clasped, and take the next and move it to the required place to be clasped, substantially as described, in combination with the anvil and the hammer, or their equivalents, as and for the purpose substantially as described.

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37,712.—Seeding Machine.—J. H. Thomas and P. P. Mast, Springfield, Ohio :

We claim the arrangement of the guide, m, in connection with the drag bars, a a, the drill teeth, c c, the chains, d d, and the hinged bar, D, provided with the cam, e, used with the seed slide, n, in the manner and for the purpose herein specified.

37,713.—Horse-power.—D. Van Houten, Fuller's Corners, Ind. :

I claim the arrangement of the four shafts, B D F and L, provided respectively with the wheel, C, pulleys, g I, pulley, G, and beveled wheel, J, and the bevel pinion, K, and pulley, M, in connection with the belts, E H, to form a new and improved horse-power, as herein set forth.

[The object of this invention is to obtain a horse-power of simple construction, with its parts arranged in such a manner that a high speed will be given to the shaft from which the power is taken, and within a very limited space, so that a very compact and portable machine will be obtained, and, at the same time, a durable one. The invention is more especially designed for driving thrashing machines, but may be advantageously used for other purposes.]

37,714.—Watch.—E. R. Wait and J. W. Phelps, Ravenna, Ohio :

We claim attaching the main wheel loosely to the barrel, and employing a ratchet to transmit the power from the barrel to the said wheel, substantially as herein specified.

[This invention consists in attaching the main wheel of a watch loosely to the barrel, and employing a ratchet to transmit the power from the barrel to the said wheel, whereby, in case of breakage of the main-spring and consequent recoil of the barrel, the latter is enabled to turn freely and save the train of wheels from the force of such recoil, which, when the barrel and main wheel are rigidly connected with each other, often result in breaking the teeth of the wheel or of the pinion.]

37,715.—Water Elevator.—S. S. Williams, Pittsburgh, Pa.:

I claim the combination and arrangement of the parts, as herein specified and shown, for the purposes as set forth.

37,717.—Dredging-box with Grater and Cake-cutter attached.—George D. Bayley, Lebanon, N. H., assignor to Giles B. Johnson, Boston, Mass :

What I claim as a new article of manufacture, is the above described article, comprising a grater, dredge-box and cake-cutter combined, substantially as set forth.

37,717.—Piano-forte.—William Bourne (assignor to Nathaniel Cummings), Boston, Mass. :

I claim extending the sounding board in rear of the hammer passage thereof, and underneath the straining pin bar of the iron frame and from side to side and end to end of the case, and so suspending the said bar over the part of such board, which is in rear of the hammer passage, that there may be a free or uninterrupted vibration space, f, between the two, substantially as hereinbefore described.

37,718.—Lantern.—P. J. Clark (assignor to S. S. Clark), West Meriden, Conn. :

I claim, as an improved article of manufacture, a lantern having its base or lower metallic portion, C, provided with an opening, c, and having a movable band, E, or a section of a band fitted upon the base, which band is also provided with an opening, b, all being arranged in such a manner that, by turning the band, the openings, b c, may be made to register, or be brought in line with each other, or placed out of register or line with each other, for the purposes specified.

[The object of this invention is to obtain a simple means whereby the lamp of the lantern may be lighted and also blown out or extinguished, and the wick raised or lowered without detaching or removing the lamp from the lantern. To this end, the invention consists in having a movable band fitted on the base or lower metallic portion of the lantern, said band having an opening made in it, also in the base or metallic portion of the lantern, so that by turning the band the opening in the latter may be made to register or be brought in line with the opening in the base, and a match inserted through the said openings, and brought in contact with the wick of the lamp; the band when the lamp is lighted and the match withdrawn, being turned so as to close the opening in the base. By this arrangement also the lamp may be blown out as well as lighted, without removing the lamp from the lantern.]

37,719.—Hoop-driving and Barrel-crozing Machine.—Edward Holmes (assignor to E. & B. Holmes), Buffalo, N. Y. :

I claim, first, Driving hoops on barrels and other casks by power applied to yielding or flexible drivers, substantially as described.

Second, The ring, K, or equivalent, on which the barrel stands while the hoops are being driven, and which may be moved out of the way for the operation of the chamfering, crozing and howeling tools, as set forth.

Third, The arms, D, in connection with the disk, D', or equivalents, for the purpose of expanding and contracting the drivers, as set forth.

Fourth, The outer revolving hollow shaft, T, which carries the chamfering, crozing and howeling tools, in combination with an inner shaft, which has a vertical movement for the purpose of imparting a lateral movement to the said tools, or either of them.

Fifth, Regulating the depth of cut of the chamfering, crozing and howeling tools (or either of them) by means of a vertical movement of a shaft, nut or head-piece, to which the said tools (or either of them) are in any manner connected.

Sixth, The construction and use of a hoop-driving machine and a barrel-chamfering and crozing machine in one machine, for the purposes and substantially as described.

37,720.—Stave-dressing Machine.—Edward Holmes (assignor to E. & B. Holmes), Buffalo, N. Y. :

I claim, first, Supporting the cutter frame upon a journal or journals, c, in such a manner that the frame may oscillate in any direction, according as the varying conditions of the stave to be dressed may require.

Second, In a machine for dressing staves which has an oscillating or movable cutter frame, in connection with the stationary or gear frame, I claim so supporting the cutter frame as to admit of the use of a weight, or equivalent, as a counterbalance to the cutter frame, substantially as set forth.

Third, I claim the projecting bars, D, or equivalent, for the purpose of supporting and connecting the cutter frame to the gear frame, and to allow the cutter frame to oscillate, as set forth.

37,721.—Hose Coupling.—Edmund B. Jucket, New Haven, Conn., assignor to himself and John W. De Lamater, New York City :

I claim, first, The lever or levers, a, when the same are combined with hose couplings, in the manner and for the purpose substantially as herein set forth.

Second, The combination and arrangement described of the lever or levers, a, and ring, C, with the hose couplings, when the same are made to operate substantially as herein specified.

37,722.—Bung for Coal-oil Barrels.—John S. Loomis and Abel Thompson, Brooklyn, N. Y., assignor to Abel Thompson, aforesaid :

I claim the ring, a, retained in the staves, substantially as specified, in combination with the screw thimble, b, and bung, f, for the purposes and as set forth.

37,723.—Breech-loading Fire-arm.—John K. Millner (assignor to himself and Samuel T. Suit), New York City :

I claim the combining the breech-pin, C, with the open, after end of a rifle barrel, which has a longitudinal loading aperture, B B, therein, when the said breech-pin is guided in its movements, secured in its positions and is made to operate in conjunction with said loading aperture, the hammer of the lock and a primed metallic cartridge placed in the chamber of the barrel, all substantially as herein set forth.

37,724.—Clothes-dryer.—George W. Newell (assignor to S. M. Davis), Lawrence, Mass. :

I claim the hub, A, with the bars, B, attached by pivots, a, in combination with the supplemental bars, C, attached to the bars, B, by links or joints b, and the pendent bar, E, attached to the bars, C, by the head, D, the bars, B C, being provided with cords, F G, and all arranged as and for the purpose set forth.

[This invention consists in pivoting a number of bars to a hub in such a manner that they may be folded together or spread apart, and having a supplemental bar attached by a link or joint to each of the pivoted bars, the upper ends of the former being secured by pivots in a head, in which a pendent bar is secured. Both sets of bars above-mentioned have cords passing through them, and all the parts are so arranged that a firm, durable and convenient clothes-horse is obtained, one that may, when not in use, be folded compactly, so as not to monopolize much room, and be capable of being very readily adjusted in proper position, when required, to receive the clothes.]

37,725.—Machine for Cutting Rasps.—A. B. Southwick and H. E. Grandy (assignor to the Whipple File Manufacturing Company), Ballard Vale, Mass. :

We claim the inclined ways, H, in connection with the cutter carriage, as set forth for the purpose specified.

We also claim the method herein described of securing the cutter to its head by means of the mortise, m, the notched bar, s, and the screw, h, operating as described.

37,726.—Paper Bag Machine.—C. H. Morgan, Philadelphia, Pa. :

I claim the machine as a whole composed of elements combined, arranged and operating substantially as herein set forth.

I also claim the use of constantly-moving feed rolls acting in combination with a tube-supporting bar, substantially as set forth.

I also claim the use of a revolving blade acting in combination with a tube-supporting bar to sever portions of tube with overlapping ends, substantially as herein set forth.

I also claim the use of rolls to hold the tube while being cut off and to act in combination with a pasting and folding blade in forming the bottom of the bag, substantially as set forth.

37,727.—Lithographic Printing Press.—G. H. Reynolds, New York City :

First, I claim the employment of the flanges, n, on the interior surface of the dampening roll, N, in connection with alternate holes in the water tube, N', substantially as and for the purpose specified.

Second, I also claim the combination of the cam-shaped pieces, O, shaft, I2, arm, i3, and studs, h2 and h4, with the dampening roll, N, substantially as and for the purpose specified.

Third, I also claim controlling the admission of water to the dampening roller, N, of a lithographic press by means of atmospheric pressure, substantially as herein described.

Fourth, I also claim the combination and arrangement of the rollers, I', shaft, I2, balance weight, W, arm, i3, and studs or stops, h2 h2, for the purpose of transferring the ink from the cylinder, J, to the inking rollers, I, substantially as herein described.

Fifth, I also claim the combination of the arm, m2, spring, m3, forked arm, m4, and duct roller, M, substantially as and for the purpose set forth.

Sixth, I also claim the combination of the multiple cam, k', fountain roller, K, arm, m2, and duct roller, M, arranged substantially as described and for the purpose specified.

Seventh, I also claim the employment of the springs, k4, between the set screws, k3, and the fountain trough, K', for the purpose above set forth.

Eighth, I also claim the combination and arrangement of the inclines, P2 P3, pins, q2, springs, q', and scraper bar, Q, for the purpose of adjusting the pressure upon the scraper, substantially as herein described.

Ninth, I also claim the combination of the wheels, R, having one flattened side, with the planes, h3, for stopping the tympan frame in the proper position, as herein described.

Tenth, I also claim the employment of the sliding teeth, S, in combination with the flattened wheels, R, and rack, H, substantially as described, for the purpose of causing the wheels, R, to engage the said racks after having been stopped.

Eleventh, I also claim in combination with the sliding teeth, S, the adjustable slotted pieces, S', for operating the said teeth, substantially as herein specified.

Twelfth, I also claim, in combination therewith the disks, T, wrist pin, t2, and stops, t3, for operating and controlling the said pieces, S'.

Thirteenth, I also claim the combination of the slotted arms or disks, u, shaft, U, cams, V, and sliding spring bars, v, or their respective equivalents for operating the disks, T, substantially as herein set forth.

Fourteenth, I also claim the combination of the shaft, U, levers, u2 and u6, and the studs, u3 and u9, attached to the reciprocating bed, F, for the purpose of operating the shaft, U, and consequently the sliding teeth, S, from the reciprocations of the bed, F, substantially as herein described.

Fifteenth, I also claim the ratchet wheel, u5, and pawls, u7 and u10, in combination with the shaft, U, lever, u6, and adjustable stop or stud, u9, for the purpose of regulating the number of movements of the bed to each impression, substantially as set forth.

Sixteenth, I also claim the cam, u12, for lifting the pawls, u7 and u10, out of contact with the teeth of the ratchet wheel, u5, in combination with the said ratchet wheel, to permit the return motion of U, substantially as herein described.

Seventeenth, I also claim the cam, u13, in combination with the pawl, u7, lever, u6, ratchet wheel, u5, and retaining pawl, u10, for bringing the said pawls into action, substantially as above set forth.

Eighteenth, I also claim the arrangement of the pulleys, x, spring pieces, x', fingers, x2, and roller, Y, for removing the sheet from the tympan, substantially as specified.

Nineteenth, I also claim the employment of the registering points, r3, in the revolving tympan frame, R', for the purpose above set forth.

RE-ISSUES.

1,409.—Coal Stove.—G. J. Kingsbury, Rochester, N. Y. Patented April 12, 1859 :

First, I claim the introduction of a second supply of air into the flame space or spaces, at or near the junction of the fire-pot, B, and cap, G, and at or near the point where the gas escapes from the combustion of the coal, for the purpose of igniting the same, in combination with an interior feeding chamber, substantially as herein set forth.

Second, I claim the annular groove, f, at the base of the feeding chamber, connected with an outer passage or passages for the admission of air to that point, arranged and operating substantially as herein described and set forth.

Third, I also claim providing in connection with the annular groove, f, the radial grooves, e e, between the top of the fire-pot and the cap resting thereon, and communicating with the outside air by passages, d d, the said grooves being provided with the lateral notches, i i i, opening into the flame space or spaces, E E, for the introduction of air for admixture with the gases, substantially as herein specified.

Fourth, I also claim the cap, G, or its equivalent, forming a connection between the fire-pot and feeding cylinder, when it conforms to the upper portion of the fire-pot, and external air is admitted underneath for the combustion of the gases, as herein set forth.

Fifth, I also claim the arrangement of the pivoted door, N, with the lower portion extended to form a plane, in combination with the flange, F, for safely supplying coal to the cylinder, H, when open, and leaving a space for the passage of the products of combustion when closed, substantially as set forth.

Sixth, I also claim, in combination with the supply cylinder, H, and fire-pot, the flue pipe, I, connected at the bottom with the ash chamber, in such a manner that when the passage of the pipe is open it allows the escape of the heat through the same, thereby giving a counter direction to the fire, preventing it from extending into the supply chamber, substantially as set forth.

1,410.—Banding Projectiles for Rifled Ordnance. (Div. 1, A.)—Edward Lindner, New York City. Patented July 30, 1861 :

I claim, first, The method, substantially as herein described, of applying the malleable envelope or packing, first by casting it around and against the annular cavity in the body of the projectile, and then expanding it by atmospheric or other pressure against the sides or interior surface of a finishing or forming mold or box.

Second, the method of securing the knit sleeve in or around the body of the projectile, substantially as described.

1,411.—Cartridge for Small-arms. (Div. 2, B.)—Edward Lindner, New York City. Patented July 30, 1861 :

I claim the stopper, d, introduced into the back end of the cartridge case, substantially as and for the purposes specified.

1,412.—Hot-air Registers.—E. A. Tuttle, Brooklyn, N. Y. Patented Jan. 3, 1854 :

I claim so combining the connecting rod or arrangement which transmits motion to the fans with the thumb-piece or attachment by which it is actuated, and with the fans themselves, that it shall rest and ride upon anti-friction bearings, o o, formed on the fans, substantially as above described.

[This invention consists in forming anti-friction bearings on the fans of a hot-air register, in such a manner that the power exerted in operating the apparatus shall not crowd directly against the journals and joints of the working parts, but shall be taken up to a great extent on these anti-friction bearings ; these bearings, by reason of their peculiar form, enable the rod to slide easily upon them ; the applied power is thus equally distributed, the fans turn naturally on their axes, there is not the usual friction in any portion of the mechanism—especially about the attachment by which it is actuated—and the entire apparatus works freely and smoothly, and requires very little power to operate it.]

1,413.—Apparatus for mixing Gases.—Allen Walton, Philadelphia, Pa. Patented April 15, 1862 :

I claim a chamber or mixing reservoir, C, so arranged as to intercept, for the purpose herein described, the continuity or uniform diameter of a distributing pipe, into which air and gas are introduced in definite quantities, and through which they are directed from a meter or meters to the burner.

1,414.—Mode of converting Reciprocating into Rotary Motion.—Turner Williams and David Heaton, 2d, (assignees of said Turner Williams), Providence, R. I. Patented Sept. 5th, 1862 :

We claim, first, The combination of two rocking disk plates, or their equivalent, with two fixed circular flanges upon a shaft, to be rotated substantially as herein specified.

Second, The use of two friction pawls, or their equivalent, for binding the said disk plates with the circular flanges at the proper time, by the rocking movement of the disk plates, and otherwise operating substantially as herein specified; and in combination with such friction pawls, a projection, n, and set screw, l, upon the disk plate, or their equivalent, for controlling the action of such friction pawls, substantially as herein specified.

Third, I claim the combination of the pair of curved connecting rods, I J, and the two disk plates, E S, or their equivalent, substantially as described, for the purpose specified.

Fourth, The use of a spring buffer or its equivalent, for arresting and limiting the movement of the two friction pawls, substantially as and to effect the purpose herein specified.

RE-ISSUE DATED JAN. 20, 1863.

1,388.—Sewing Machine.—J. G. Wilson, New York City, assignee of W. H. Akins and J. D. Felthousen, Ithaca, N. Y. Patented Aug. 5, 1851 :

First, I claim the employment, in combination with a reciprocating needle and a flat surface which supports the material to be sewed, of a rotating toothed feeding wheel, or other equivalent feeding device, to which the cloth is not attached, and a holder which holds the material against the said feeding device, with a yielding pressure, substantially as and for the purposes herein specified.

Second, I claim the combination of a toothed feed wheel, or its equivalent, with a driving apparatus which provides for its operation to feed the material to be sewed either from right to left, or *vice versa*, and to reverse the direction of the feed without stopping the machine, substantially as and for the purpose herein described.

Third, I claim the above-described devices for effecting and controlling the relative movements of the needle and shuttle, whereby the shuttle enters between the needle and its thread while the needle is arrested after a short retrograde movement, substantially as and for the purpose herein specified.

Fourth, I claim the employment, in a sewing machine, of a table which presents a surface for the support of the material to be sewed on every side of or all around the needle in combination with a feeding device, substantially as herein described.

Fifth, I claim the circular rest, w, applied in front of the machine, substantially as described for the purpose of supporting and affording convenience for sewing the articles of circular or tubular form, as herein set forth.

Sixth, I claim bringing up the needle, after the stitch is formed, by a spring, t, or its equivalent, operating substantially as herein described, for the purpose of tightening up the stitch after the manner of hand sewing.

Seventh, I claim producing friction upon or griping the needle thread between the seam and the bobbin or spool from which the said thread is supplied, by means of the spring and catch, or its equivalent, substantially as and for the purposes herein specified.

Eighth, I claim, in a sewing machine, feeding the cloth or other substance to determine the space between the stitches by the friction of the surface of the periphery of the feed wheel or any equivalent feeding device, substantially as specified, in combination with a spring pressure plate or pad which gripes the cloth or other substance against such feeding surface, substantially as specified and for the purpose set forth.

Ninth, I claim projecting the operative part of the surface of the feeding apparatus, through the surface of the table, substantially as described, so that such feeding surface may act on a portion of the under surface of the material to give the required feeding motion, to space the stitches, while the other portions of said material slide on the table, which answers the purpose of freeing the said material from the feeding surface, and to cover and protect the parts of the feeding device which are below the table.

Tenth, I also claim the combination of the mechanism, substantially such as is herein described, so that the cloth or other material to be sewed being placed upon the machine under the pressure pad will be automatically carried forward to receive the stitches, substantially as herein described, and so that seams of any desired length may be conveniently sewed into curves or figures at the will of the operator.

DESIGNS.

1,719.—Design for a Statuette.—J. A. Bailly, Philadelphia, Pa.

1,720.—Design for a Lamp Chimney.—W. W. Skaats (assignor to Gideon Skaats), Brooklyn, N. Y.

NOTE.—The Patent Office is at present in most excellent working order, and the number of applicants for patents is constantly increasing. The above list contains the claims of SIXTY-EIGHT patents issued in a single week, and of this number TWENTY-SEVEN were conducted through the Scientific American Patent Agency.—EDS.

TO OUR READERS.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given ; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona fide* acknowledgment of our reception of their funds.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and in losing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, &c., containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO.,
No. 37 Park-row, New York.

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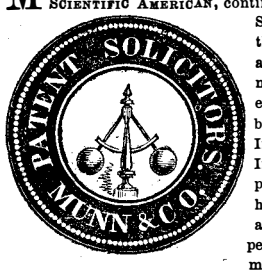
IMPORTANT TO INVENTORS.

PATENTS FOR SEVENTEEN YEARS.

MESSRS. MUNN & CO., PROPRIETORS OF THE SCIENTIFIC AMERICAN, continue to solicit patents in the United States and all foreign countries, on the most reasonable terms. They also attend to various other departments of business pertaining to patents, such as Extensions, Appeals before the United States Court. Interferences, Opinions relative to Infringements, &c. The long experience Messrs. MUNN & Co. have had in preparing Specifications and Drawings, has rendered them perfectly conversant with the mode of doing business at the United States Patent Office, and with the greater part of the inventions which have been patented. Information concerning the patentability of inventions is freely given, without charge, on sending a model or drawing and description to this office.



THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent free of charge. Address MUNN & CO., No. 37 Park Row, New York.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands such examinations have been made through this office. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank-bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

The revised Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the Government fee required on filing an application for a patent is *reduced* from **$30** down to **$15.** Other changes in the fees are also made as follows —

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (but in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

During the last seventeen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the inventors throughout the country, we would state that we have acted as agents for at least TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees at home and abroad. Thousands of inventors for whom we have taken out patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the inventors whose patents were secured through this office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive offices, and we are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat, under the new law, is $10. A pamphlet of advice regarding applications for patents and caveats, printed in English and German, is furnished gratis on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

ASSIGNMENTS OF PATENTS.

Assignments of patents, and agreements between patentees and manufacturers are carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

It would require many columns to detail all the ways in which inventors or patentees may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of patentees will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

We are prepared to undertake the investigation and prosecution of rejected cases on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief story of the case, inclosing the official letters, &c.

FOREIGN PATENTS.

We are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business we have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through the Scientific American Patent Agency, No. 37 Park Row, New York.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through our Agency, the requirements of different Government Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park Row, New York, or any of our branch offices.

Notes and Queries

[Many letters are addressed to us for information about the purchase of books, machinery and various other articles, also making inquiries about sundry things, requesting an answer through the paper. Such inquiries are generally of no interest to any one except the writer, hence we decline to use valuable space in our paper to notice them, and as no stamps are inclosed, the inquiries remain unanswered. We submit to all our readers that it is unjust to expect us to spend time to answer letters and forward them at our own charges. We mean to do our best for our readers, but they ought not to burden us with their private matters without inclosing a fee.]

A. P. K. Jr., of C. W.—Boghead coal is a peculiar cannel coal found in Scotland. It is very rich in oleflant gas and oil. "Water lime" is hydraulic cement, and is so named because it becomes hard under water. It is employed as the cement for cisterns, piers and concrete structures under water.

R. B., of Pa.—We were not aware that the shrunken band on the Parrott gun had any such effect as you propose, and cannot find any authority for believing the recoil of a gun to be affected by the form of the breech. Any increase of weight will diminish the recoil, but we cannot understand how any form of the breech can have such effect.

W. B. Le V., of Pa.—We have received your diagrams of the performance of two engines—one working steam at full stroke and the other cutting off at a point not stated—with descriptions attached and thank you for your attention. We have discussed this subject very fully at different times and shall refer to it again shortly, for which purpose we shall retain your evidence.

W. L. T., of N. H.—By procuring one of our recently issued pamphlets you will obtain all the information you need in regard to caveats. Upon receipt of six cents we will forward one by mail to your address.

L. T., of Mass.—You state that your invention has been in use since 1859, that you have reason to fear some other party has applied for a patent on it, and desire to know what are your rights in this matter. This is the old and oft-repeated story, several cases of the kind having within a short time been presented to us for our opinion. We have repeatedly stated in the columns of the SCIENTIFIC AMERICAN that the public use of an invention for more than two years prior to the application for the patent would invalidate the inventor's claim. You must, therefore, submit to this state of facts, and learn from it the truth of that old saying—"delays are dangerous and often fatal."

J. H. A., of Conn.—Paper parchment is not manufactured in America. The best method of rendering paper water-proof is to soak it in boiled linseed oil and dry it thoroughly. It may also be rendered water-proof with copal varnish, but it is not so elastic as the oil.

R. H. F., of Mass.—You may study all the books on engineering ever published and yet fail to become a reliable practical engineer. You must learn the business by actual practice first as a fireman and then as an engineer.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, February 18, to Wednesday February 25, 1863:—

N. S., of Ind., $25; M. A. J., of Mass., $25; F. B. B., of Ill., $30; B. & B., of N. J., $44; J. A. McC., of Ky., $20; D. M., of Ind., $12; J. B., Jr., of Mass., $15; F. D. B., of Ind., $15; W. H. B., of N. Y., $15; A. S., of Conn., $25; W. H. M., of Mo., $25; G. B. McD., of Ky. $17; E. B., of N. Y., $20; F. W. R., of N. Y., $10; W. K., of N. Y., $25; M. F. G., of N. Y., 63; J. R. D., of Wis., $20; G. S., of Mass., $25; T. M. C., of Maine, $20; A. F. N., of N. Y., $12; J. F. R., of N.Y., $25; F. P. S., of N. Y., $25; W. W. W., of Conn., $15; H. U., of Conn., $15; S. & B., of Ill., $15; I. G., of Conn., $290; G. H. S., of Iowa, $25; G. C. B., of Ill., $15; J. A. W., of Wis., $35; W. C. H., of Ohio, $15; D. C. S., of Conn., $10; L. & E., of Ill., $15; F. H. M., of N. Y., $25; M. T. W., of Ky., $15; J. M. D., of N. Y., $45; M. & B., of N. Y., $80; B. T. S., of Ill., $20; R. B., of Mass., $46; R. H. G., of N. Y., $120; J. D. B., of Vt., $20; R. F. C., of N. Y., $20; W. B. F., of Mich., $20; S. B. C., of N. Y., $12; D. B. H., of N. Y., $25; F. H. B., of N. Y., $25; H. R., of Mass., $12; C. O. L., of Vt., $30; J. W., of Ill., $70; S. C. S., of Ill., $15; T. J. & J. H. McG., of Ohio, $40; G. D., of Mass., $30; J. R. B., of Ind., $15; C. C. W., of Ill., $15; F. L. S., of Pa., $15; E. B., of Mo., $25; R. J. & F. D. P., of Iowa, $10; J. H., of N. Y., $25; C. W. H., of N. Y., $20; W. M., of N. Y., $20; A. W. S., of N. Y., $20; C. B., of Mich., $20; A. R., of N. J., $20; T. C. F., of N. Y., $20; C. D., of Ill., $20; C. D., of N. Y., $15.

[Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, and inform us the amount, and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Wednesday, February 18, to Wednesday, February 25, 1863:—

M. A. J., of Mass.; D. & T. W., of Cal.; A. B, of Mo.; G. D., of Mass.; J. H., of N. Y.; N. A.; of Conn.; C. W. H., of N. Y.; M. F. G., of N. Y., (2 cases); R. H. G., of N. Y., (3 cases); T. C. McK., of Tenn.; F. P. S., of N. Y.; F. R. B., of Ill.; H. R., of Mass.; G. H. S., of Iowa; S. C. B., of Ill.; J. A. W., of Wis.; W. H. M., of Iowa; M. & B., of N.Y., (2 cases); R. B., of Mass.; A. F. N., of N. Y.; J. F. R., of N. Y.; F. H. B., of N. Y.; N. S., of Ind.; J. A., of Ky.; B. & B., of N. J., (2 cases); D. M., of Ind.; G. B. McD., of Ky.; E. B., of Mo.; W. K., of N. Y.; H. M., of N. Y.; S. B. C., of N. Y.; D. B. H., of N. Y.

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Twenty-five Cents per line for each and every insertion, payable in advance. To enable all to understand how to compute the amount they must send in when they wish advertisements inserted, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns; and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

AHERETOFORE UNSUPPLIED WANT.—THE NATIONAL ALMANAC and Annual Record for 1863, furnishing more full, accurate, recent and interesting information concerning the present condition of our country than has ever been issued in any single volume. In the extent, fullness and accuracy of its statistics, and the variety and completeness of its details, it is believed that the National Almanac far surpasses any previous statistical work on the United States, and that it must become such a hand-book of reference for every thing appertaining to our national condition as every person will need. Notwithstanding the large amount expended in getting up this work (over five thousand dollars), and the high price of paper, it is furnished at a very low price. 12mo, 700 pages, bound in Boards, price $1, or substantially bound in muslin, $1 25. Sent free, by mail, on receipt of price. Address GEORGE W. CHILDS, Publisher, 628 and 630 Chestnut street, Philadelphia, Pa. Agents wanted everywhere. 10 2

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WANTED—SOME MACHINE-SHOP TO TAKE THE exclusive manufactory of Hadley's Patent Tap Guide, consisting of cast-iron stand, steel spiral spring and wrought-iron collar. See cut in SCIENTIFIC AMERICAN, Vol. VII., No. 25. Address for two weeks, WM. S. HADLEY, care of the SCIENTIFIC AMERICAN Office, New York; after that, Newark, Huron County, Ohio. 1*

ANY PERSON HAVING A NEW OR SECOND-HAND Lathe for sale, that will swing 40 to 50 inches, are requested to address a line to Drawer 399, Post-office, Detroit, Mich. 1*

FOR WOOD LATHES, SCROLL SAWS, SAW BENCHES and wood-working machinery, address J. A. FAY & CO., or E. C. TAINTER, succeeding partner, Worcester, Mass. 1*

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T. SHANKS, MACHINIST, SEWING MACHINE DEALer and Repairer. All kinds on hand for sale or exchange. No. 36 N. Green street, Baltimore, Md. 9 4*

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WANTED—A GOOD SECOND-HAND STEAM ENgine, 25 to 30 horse power. Address GUILD & GARRISON, 74 Beekman street, New York, or 55 and 57 First street, Williamsburgh, L. I. 9 tf

HOWARD ASSOCIATION, PHILADELPHIA, FOR the Relief of the Sick and Distressed, afflicted with Virulent and Chronic Diseases. Medical advice given gratis by the Acting Surgeon. Valuable Reports on various Diseases, and on the NEW REMEDIES employed in the Dispensary, sent in sealed letter envelopes, free of charge. Address DR. J. SKILLIN HOUGHTON, Howard Association, No. 2 South Ninth street, Philadelphia, Pa. 10 2*

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THE CHEAPEST MODE OF INTRODUCING INVENTIONS.

INVENTORS AND CONSTRUCTORS OF NEW AND useful Contrivances or Machines, of whatever kind, can have their Inventions illustrated and described in the columns of the SCIENTIFIC AMERICAN on payment of a reasonable charge for the engraving.

No charge is made for the publication, and the cuts are furnished to the party for whom they are executed as soon as they have been used. We wish it understood, however, that no secondhand or poor engravings, such as patentees often get executed by inexperienced artists for printing circulars and handbills from, can be admitted into these pages. We also reserve the right to accept or reject such subjects as are presented for publication. And it is not our desire to receive orders for ngraving and publishing any but good Inventions or Machines, and such as do not meet our approbation in this respect, we shall decline publish.

For further particulars, address—

MUNN & CO.,
Publishers of the SCIENTIFIC AMERICAN,
New York City

DR. G. W. SCOLLAY'S

AIR-TIGHT DEODORIZING BURIAL-CASE, PATENTED MARCH 18, 1862.

The undersigned desires to call the attention of Undertakers, and all parties interested, to a new and useful improvement in Burial-Cases, by means of which a human body may be withheld from interment some sixty to ninety days, or more, without the emission of the usual offensive odor, and at a small expense beyond that of the ordinary burial-case. The invention is simple, effective, and not liable to derangement.

When the invention was completed, and its efficacy tested by numerous experiments, to the satisfaction of the undersigned, he brought it before the Western Sanitary Commission of St. Louis, who, on the 28th of April, 1862, appointed a Scientific Committee to investigate its merits, and report thereon. This Committee, under date of May 15, 1862, presented an elaborate report, for which there is no room in this advertisement to mention. The conclusion of the report, however, is here given:

"In conclusion, your Committee cannot but feel that the advantages of the improvement are obviously many and great, and the practicable points deducible from the foregoing, and which your Committee regard as established, are as follows:

"FIRST—Dr. Scollay has succeeded in making the common wooden coffin water-tight and air-tight, up to a certain degree of pressure.

"SECOND—Beyond this point, by the judicious application of a self-adjusting valve, the gases are allowed to escape, and the coffin secured against explosion.

"THIRD—By the introduction of a chemical compound, he renders the escaping gases inoffensive and disinfecting.

"FOURTH—Its cheapness is such as to place it within the reach of all.

"FIFTH—Having examined the improvement carefully, and conducted satisfactory experiments, we regard it as our duty in the present exigency to bring it speedily before the public, and recommend its general adoption.

"All of which is respectfully submitted:

(Signed) "S. POLLAK, M.D.
"CHAS. A. POPE, M.D.
"JOHN T. HODGEN, M.D.
"M. SCHUYLER, D.D.
"JOHN B. JOHNSON, M.D.
"R. R. HAZARD, JR.

'St. Louis, May 15, 1862."

When the foregoing had transpired, the subscriber went immediately to Washington with the following letter of introduction, to lay the matter before the proper authorities there:

"ROOMS WESTERN SANITARY COMMISSION, St. LOUIS, June 26, 1862.

"DR. WM. G. HAMMOND, Surgeon-General U. S. A.

"DEAR SIR—I take pleasure in introducing to you Dr. G. W. Scollay, of this city, who, on our recommendation, visits Washington to bring to your notice an improvement in Burial-cases, which is regarded by this Commission as of great value. I would simply state that a Scientific Committee was appointed by this Commission to investigate the merits of this invention, the result of which investigation is an elaborate report, in which the Commission fully concur, and to which I respectfully refer you.

"Yours, very truly,
"JAMES E. YEATMAN, President."

The result of the visit of the undersigned to Washington is best set forth by the following certificates of the Surgeon-General and the Assistant-Surgeon-General of the U. S. A.

"OFFICE SURGEON-GENERAL U. S. A. WASHINGTON, July 18, 1862.

"My attention has been called by the Western Sanitary Commission at St. Louis, to an invention of Dr. G. W. Scollay, called an 'Air-tight Deodorizing Burial-case. I have examined the same; and at my request, Dr. Scollay has conducted and concluded an experiment therewith, under my personal observation.

"The result is perfectly satisfactory, and has convinced me that the claims made for this case are substantial, and that the improvement is one of great practical utility; that the principle of its most important feature—the deodorizer—is correct; while the application of it, as made by Dr. Scollay, to an ordinary burial-case, is so simple, cheap and effective, as to commend it strongly for general use. For sanitary and other reasons, I cordially recommend its adoption for army purposes, especially in all cases where it is desirable to withhold a body from interment an unusual length of time, or to transport it to distant points.

"WILLIAM A. HAMMOND,
"Surgeon-General U. S. A."

"I fully concur in the above opinions and recommendation of the Surgeon-General, and think the invention of Dr. Scollay very valuable in its sanitary relation.

"R. C. WOOD, Assistant Surgeon-General,
"Surgeon-General's Office, Washington, July 18, 1862."

The undersigned takes great pleasure in also submitting for public perusal the following communication from "the great Surgeon of the Age," the celebrated Doctor Valentine Mott, who has kindly permitted its publication:—

"NEW YORK, December 27th, 1862."

"At the request of Mr. Boyle, and accompanied by him and Mr. Todd I visited to-day and carefully examined the 'Air-tight Deodorizing Burial-case' of Dr. Scollay, of St. Louis, Mo.

"In times like the present, when so many are bereft of one or more members of their families by the calamities of a horrid war, it is humane and natural that their remains should be sought and transported to their homes, in order that their bones may repose with their kindred.

The rich and the titled can afford to be embalmed, but the commoner must be pitched into the pit unheeded and unknown.

"*Dr. S. is entitled to great credit for his newly-invented Coffin, as having done a public good.*

"The lightness and cheapness of the case are what will recommend it to the public.

"*The composition that is put in the Deodorizing Box at the foot of the Coffin within seems quite sufficient to prevent the least disagreeable odor.*

"In the experiment which I witnessed, the Body had remained in the Coffin for *nearly eight weeks in a chamber without emitting the least offensive smell.*

"The small patent elastic, self-acting and self-adjusting valve placed at the foot of the coffin, in direct connection with the Chemical Box or Deodorizer, and serving the two-fold purpose of permitting the escape of the offensive gases generated by the decomposition of the Body enclosed therein, *and, at the same time, excluding the entrance of atmospheric air*, evinces, on the part of Dr. Scollay—from the simplicity of its mechanical construction—*rare inventive skill*, and he assuredly merits deserved praise for his ingenuity.

"VALENTINE MOTT,
"No. 1 Gramercy Park."

"NEW YORK, February 2d, 1863.

"A period of nearly five weeks having elapsed since I wrote the above, I have this day again made another *careful examination* of the experiment alluded to. The decomposition of the subject (which I omitted to say is enclosed in an ordinary 'Walnut' or 'Whitewood' coffin, with Dr. Scollay's invention attached) has rapidly increased, and, although it has remained upwards of *three months* in a *room or chamber, at a mild temperature*. I cannot discover the *slightest approximation to any disagreeable or offensive odor*.

"I, therefore, have no cause to alter the opinions which I have heretofore expressed in relation to Dr. Scollay's ingenious invention.

"VALENTINE MOTT,
"No. 1 Gramercy Park."

The undersigned would state, as a sequel to this mode of bringing his invention before the public, that his "Air-Tight Deodorizing Burial-Case" has been adopted, and is now in general use in some of our large Western cities; and that it can be immediatly furnished by any of our undertakers to parties desirous of having the remains of their deceased relatives or friends removed from this or other cities, or from distant localities. As before stated, this case is not expensive. It is extremely light and therefore convenient for transportation—is not liable (*like the Iron Burial-case in present use*) to explosion from the expanding pressure of gases generated by ordinary decomposition; and, *which is more important than all*, the very *expensive, disagreeable* and oftentimes *unsuccessful process of the present method of Embalming* is *entirely avoided*—the simple application of this invention to the *ordinary Wooden Coffin rendering a recourse to the latter mode of interment altogether unnecessary.*

G. W. SCOLLAY, M.D.

These Cases are now being manufactured, and can be immediately supplied by—

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Mr. John A. Smithers, undertaker, St. Louis, Mo.;
Mr. C. S. Wheeler, undertaker, Baltimore, Md.;
Mr. J. M. Hall, undertaker, Philadelphia, Pa.;
Mr. Wm. H. Bigelow, No. 451 Pennsylvania Avenue, Washington City.

Parties desiring information, or wishing to purchase the right of using this invention in either of the States or Territories, will please address O. W. CHILD,
No. 78 Cedar street, New York.

New York, Feb. 20th, 1863. 9 2*

A VALUABLE WORK FOR INVENTORS, PATENTEES AND MANUFACTURERS.

The publishers of the SCIENTIFIC AMERICAN have just prepared, with much care, a pamphlet of information about Patents and the Patent Laws, which ought to be in the hands of every inventor and patentee, and also of manufacturers who use patented inventions. The character of this useful work will be better understood after reading the following synopsis of its contents:—

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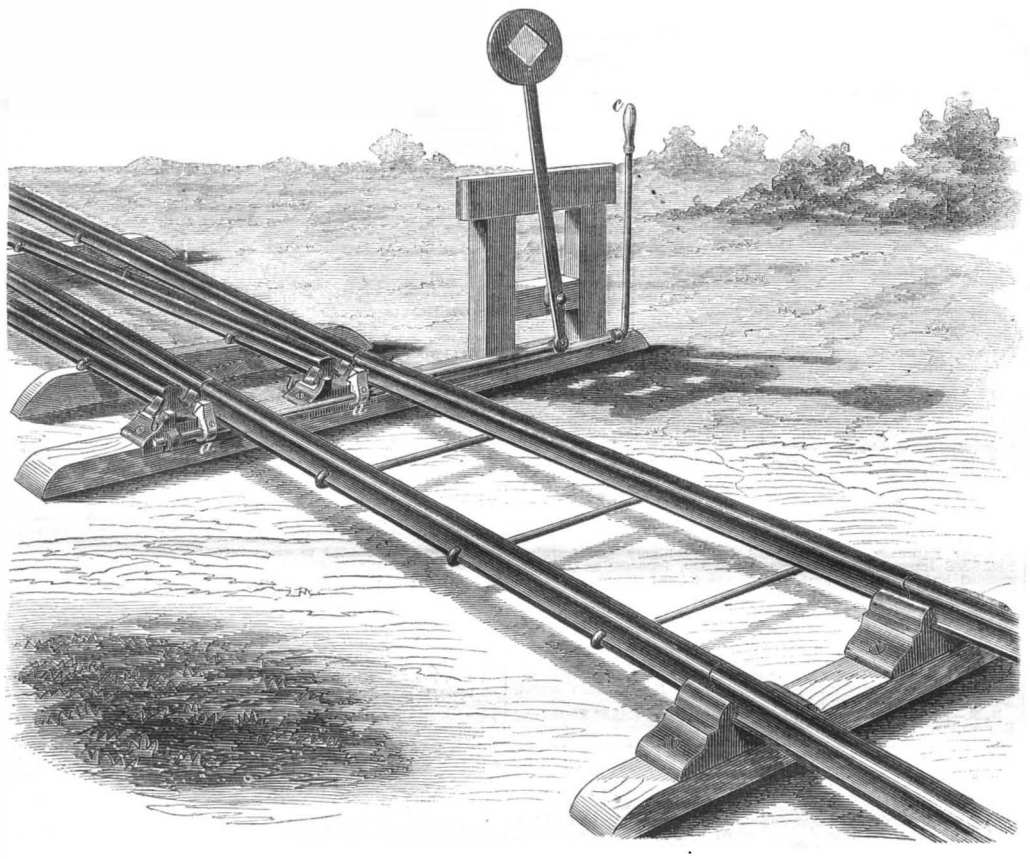
Improved Railroad Switch.

Many valuable lives and large amounts of property are constantly being destroyed on railroads by having the tracks so misplaced at the switches that the trains are thrown off. These accidents occur through many causes, not the least of which is the negligence of the watchman or switch-tender to bring the rails in the proper place. The device which we here illustrate, is intended to prevent accidents of this kind, as the engineer can see at a long distance whether the tracks are in a continuous line, or whether they only approach correctness; he can then stop his train in time to avoid accident. The invention consists in disposing a pair of dogs, *a*, fixed upon a horizontal shaft in connection with the side of the rail, so that they confine the latter as immovably between two



MARSHALL'S PATENT RAILROAD SWITCH.

iron jaws as if they were in a vice. There are two stops, *b b*, on the chair in which the ends of the switch rails work, which stops limit the motion of the rails and prevent them from being thrown over too far. When the track is to be shifted for the passage of a train, the small handle, *c*, is thrown down horizontally, this releases the toes from their hold and the rails may then be thrown over by the ordinary brake; when the train has passed, the handle is raised and the toes bind on the opposite side of the rails and bring them in direct line with the main track. It will be evident to the reader that, if the vertical handle is not in the position shown in the engraving, the switch is not safe, as the track is liable to be deranged by passing trains; and it is valuable in this, that the persons in charge can see at a glance, even from a distance, the condition of the line. This switch has been in use for the past year on one of the New England roads and has given great satisfaction; it is the invention of Mr. Oliver W. Marshall, of Windsor Locks, Conn., and was patented on June 18, 1861; further information respecting it can be had by addressing the patentee at that place.

MACHINERY versus MUSCLE.

Which is the best—machinery or manual labor? If tools are of any benefit to manufacturers, particularly of machinery, why not use them instead of occupying twice the necessary time in removing superfluous metal with a hammer and chisel or a file? There are but few processes at the present time that cannot be performed by tools, either ordinary or those designed for some special purpose. These remarks are stimulated by seeing men in some of our large shops hacking away with a hammer and chisel on work that they could do better and more profitably to themselves and their employers in a lathe or planer. A slotting machine is one of the most useful tools in a shop; a compound planer is also a good tool, and the busy, quick-stroke, shaping machines can do more work, of a better class, than all the flat or cape chisels in the country. It looks out of place and behind the times to see a man with a rock-shaft arm or a connecting rod in the vice, chipping, slowly and carefully, portions that might be cut off in a twinkling by the proper tools. There are not enough slotting machines in use, and of the lighter tools there are also too few. We should like to see all work done by machinery, that can be advantageously done; and then the workman could take his proper place and oversee the "slave" that saves him unnecessary toil and labor.

There is by far too much pulling and hauling by muscle where machinery would do the business quicker and better. It was thought to be a terrible innovation on established customs when portable engines came into use for hoisting out, or stowing in, ships' cargoes. The loud cry of the stevedore's gang is hushed—the call of the 'longshoremen, summoning their mates away to labor, is heard no more; a little portable engine, standing in six square feet, contains all the muscle and will of five hundred workmen, and, obedient to the signal, runs away with the heavy bales and boxes, and snatches them up aloft as though they were so many feathers. This is just what we desire to see. In the present age we have the apotheosis of machinery—science active, eager and vigilant to advance the best interests of mankind. Muscle is down, and brain power is up. Weighed in the balance, main strength and stupidity must always kick the beam, opposed to patient and laborious thought.

Let us have more useful machinery. In every situation of life, we see openings that demand the substitution of improved methods for obsolete ones. The work of housekeeping alone has been lightened a hundred fold by the ingenuity of our inventors; and our readers have only to reflect, and they will see for themselves that this assertion is true. Keep on in the good work; it will not invalidate manual labor, where it is wanted, but will enhance its worth. There will not be so many hewers of wood and drawers of water; but there will be more, and a better class, of intelligent, thoughtful men, who, by seeking out causes and effects, increase the value of their own labor, and advance the interests of the world materially. "Man shall earn his bread by the sweat of his brow," and he does; invention is the sorest toil; they who consume the midnight oil know this; they who, tortured on the rack of thought, turn restlessly and uneasily in the night, big with the inspiration of some new and valuable machine or process, they know this; all men who have ever given time, toil, and patient reflection to the details of some new tool, will acknowledge the truth of the statement that invention is sore toil. Therefore let us honor our inventors, and stimulate them to still greater efforts. Let us not be wanting in our appreciation of the exertions they are making to improve themselves and develop the best interests of the country, but show our gratitude by employing new machinery wherever it can be profitably introduced.

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To the Mechanic and Manufacturer!

No person engaged in any of the mechanical pursuits should think of doing without the SCIENTIFIC AMERICAN. It costs but six cents per week; every number contains from six to ten engravings of new machines and inventions which cannot be found in any other publication. It is an established rule of the publishers to insert none but *original* engravings, and those of the first class in the art, drawn and engraved by experienced artists, under their own supervision, expressly for this paper.

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FROM THE STEAM PRESS OF JOHN A GRAY

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